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101

The Mariners leaning over the gunwale of the ship, admire in silence these ceriel landscapes.

vide St Pierres Studies of Nature Vol. 2, p. 79.

GARDEN.

THE

WORKS

OF

SAINT-PIERRE.

COMPRISING HIS

STUDIES OF NATURE,

PAUL AND VIRGINIA,

AND

INDIAN COTTAGE.

WITH

A MEMOIR OF THE AUTHOR, AND EXPLANATORY NOTES,

BY

THE REV. E. CLARKE.

IN TWO VOLUMES.

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STUDIES OF NATURE.

STUDY VIII.

REPLIES TO THE OBJECTIONS AGAINST DIVINE PROVIDENCE, AND THE HOPES OF A FUTURE LIFE, FOUNDED ON THE INCOMPREHENSIBLE NATURE OF GOD, AND THE MISERIES OF A PRESENT STATE.

"WHAT avails it me," some one will ask, "that tyrants are punished, if I am to be their victim? Can these compensations be the work of a God? Great philosophers who have devoted their whole lives to the study of Nature have not discovered who was its author. Who ever saw God? Who made God? But granting that a supreme intelligence governs the universe, it has assuredly abandoned man to himself: his career is not marked out; it appears as if for him two deities existed, the one inviting him to pleasure, the other dooming him to privations; a God of Nature and a God of Religion. He knows not which of the two he ought to please; and, in attaching himself to either party, is ignorant whether he is worthy of love or of hatred. His virtue itself fills him with doubts and scruples; it renders him miserable both internally and externally; it involves him in perpetual warfare with himself, and with the world, to the interests of which he sacrifices himself. If he is chaste, the world calls him impotent;

·f he is religious he is accounted a man of a weak mind; ·f he is benevolent to those around him, he is destitute of ·ourage; if he devotes himself for the good of his country he is a fanatic; if he is simple, he is duped; if he is modest he is supplanted; he is every where derided, betrayed, despised as well by the philosopher as by the devotee. On what foundation can he build the hope of reward for so many struggles? On a life to come. What certainty has he of its existence? Has he ever seen any one return from that unknown state? What is his soul? Where was it a century ago? Where will it be one hundred years hence? It expands with the senses, and with them it expires. What becomes of it in sleep, or in lethargy? It is pride that persuades him that it is immortal: Nature every where points out death to him in his monuments, in his tastes, in his loves, in his friendships; and every where man is obliged to dissemble this idea. To render his life less miserable, he is under the necessity of seeking diversion, that is, according to the literal signification of the word, he is obliged to turn away from the spectacle of woes which Nature presents to him on every side. To what labors has she not subjected his miserable life! The beasts are a thousand times more happy; provided with clothing, lodging, food by the hand of Nature, they resign themselves without solicitude to their passions, and they finish their career, without any presentiment of death, without any dread of an hereafter.

"If a god presides over their destiny, he must be inimical to the happiness of mankind. Of what advantage is it to me that the earth is covered with vegetables, if I have not the shade of a single tree at my disposal? What are to me the laws of harmony and of love which govern Nature, if I see around me only faithless objects, or if my fortune, my condition, my religion impose celibacy upon me? The general happiness diffused over the earth serves only to aggravate my individual wretchedness. What interest can I take in the wisdom of an order, which rene-

vates all things, when, as a consequence of this same order, I feel myself sinking into everlasting annhilation? One single miserable being might arraign Providence, and say with Job, the Arabian; 'Wherefore is light given to him that is in misery, and life unto the bitter in soul?' Alas! the appearances of happiness have been unveiled to the view of man only to cut him off from all hope o. ever attaining it. If a Deity, intelligent and beneficent, governs Nature, diabolical spirits tyrannize over the children of men."

I shall first reply to the principal authorities by which some of these objections are supported. They are in part extracted from a celebrated poet and a learned philosopher, from Lucretius and from Pliny.

Lucretius has clothed in very beautiful verses the philosophy of Empedocles and of Epicurus. His imagery is enchanting; but his philosophy of atoms combining together by accident is so absurd, that wherever it appears it destroys the beauty of the poetry. In confirmation of this opinion I refer to the sentiments of his partisans themselves. It speaks neither to the heart nor to the understanding. It is equally erroneous in its principles and in its consequences. "To whom," it might be asked, do these primary actions of which you construct the elements of Nature owe their existence? Who communicated to them their first movement? How could they impart to the aggregation of a great number of bodies, a spirit of life, a sensibility, a will, which they themselves never possessed? If you believe with Leibnitz that these *monads*, or unities, actually have perceptions peculiar to themselves, you give up the laws of chance, and are obliged to allow the elements of Nature an intelligence which you refuse to her author." Descartes has, indeed, subjected these impalpable principles, and if I may so express myself, this metaphysical dust to the laws of an ingenious Geometry; and after him, a multitude of philosophers, seduced by the facility of constructing all sorts of systems

with the same materials, have applied to them alternately, the laws of attraction, of fermentation, of chrystallization, in a word, of all the operations of chemistry, and of all the subtleties of logic; but the one with as little success as the other. We shall demonstrate in the succeeding article, when we treat of the weakness of human reason, that the method adopted in our schools of tracing objects to their first causes, is the perpetual source of the errors of our philosophy, physical as well as moral. Fundamental truths resemble the stars, and our reason is like the graphometer. If, in this instrument, which we employ for making observations, ever so slight an error has been made; if at the point of departure we commit a mistake of the smallest angle imaginable, the error, at the extremity of the visual rays, becomes incalculable.

There is something still more strange in the process of Lucretius. It is this, that in a work, in which he attempts to materialize the Deity, he sets out with deifying matter In this respect he has himself given way to a universal principle, which we shall endeavour to develop when we come to treat of the proofs of the Divinity from sentiment; namely, that it is impossible powerfully to interest mankind, in any way whatever, without presenting to them some of the attributes of the Deity. Before he attempts therefore, to dazzle their understandings as a philosopher, he begins with inflaming their hearts as a poet. Here is part of his exordium.

————Hominum divumque voluptas
Alma Venus, cœli subter labentia signa,
Quæ mare navigerum, quæ terras frugiferentes
Concelebras, per te quoniam genus omne animantûm
Concipitur, visitque exortum lumina solis;
Te, Dea, te fugiunt venti, te nubila cœli,
Adventuque tuo tibi suaves Dædala tellus
Submittit flores, tibi rident æquora ponti,
Placatumque nitet diffuso lumine cœlum.
. . . . . .
Quæ quoniam rerum naturam sola gubernas
Nec sine te, quidquam dias in luminis oras
Exoritur, neque fit lætum, neque amabile quidquam,

Te sociam studeo scribendis versibus esse,
Quos ego de rerum naturâ pangere conor.
. . . . . .
Quo magis æternum, da dictis, Diva, leporem.
Effice ut in terra fera munera militiai
Per maria ac terras omnes sopita quiescant;
Nam tu sola potes tranquillâ pace juvare
Mortales, quoniam belli fera munera Mavors
Armipotens regit, in gremium qui sæpe tuumse
Rejicit, æterno devictus vulnere amoris.
. . . . . .
Hunc tu Diva tuo recubantem corpore sancto
Circumfusa super, suaves ex ore loquelas
Funde, petens placidam Romanis, inclita, pacem;
Nam neque nos agere hoc patriai tempore iniquo,
Possumus æquo animo.

De Rerum Natura, lib. 1.

I shall endeavour to give as well as I can the meaning of these beautiful verses.

"Delight of men and of Gods, gentle Venus, who, elevated above the glistening luminaries of heaven, presidest over the sail-shadowed sea and the fruitbearing earth; by thee the whole creation is called into life, and to behold the light of day. At thy approach, O Goddess, the winds are hushed, the clouds of heaven disperse; the Dædalian shore spreads beneath thee a carpet of odoriferous flowers, the billows of ocean smile, and the serene sky diffuses a milder light.—As thou then reignest sole empress of Nature, as, without thee no creature can rise into life, and nothing happy, nothing amiable can exist, deign to be my companion, while I attempt to sing the nature of things... Give then, O Goddess, unfading graces to my strains. Grant that meanwhile the horrors of war may cease over every land and over every sea. Thou alone canst dispense to mortals the blessings of peace, since Mars, allpowerful in arms, directs the thunders of war, and wounded by the shafts of an eternal love, often reposes on thy lovely bosom.—In those soft moments of amorous dalliance, intreat him to grant peace to the Romans; for how can the Muse be heard amidst the noise of civil discord?"

Lucretius indeed, is obliged to admit, in the sequel of his work, that this beneficent goddess is chargeable with

the ruin of health, of fortune, of understanding, and sooner or later of reputation, that from the very lap of her pleasures issues a something which embitters enjoyment, which torments and renders us miserable. The unfortunate poet himself fell a victim to it, for he was carried off in the flower of his age, either by his excesses, according to some, or by poison, administered in a love-potion by a woman, according to others. He here ascribes to Venus the creation of the world; he addresses prayers to her; he gives to her body the epithet of sacred; he invests her with a character of beneficence, justice, intelligence and power which belongs to God alone; in a word, the attributes are so exactly the same, that if you suppress the name of Venus, in the exordium of his poem, you may apply it almost entirely to divine wisdom. There are even points of resemblance so striking between the above lines and the description given of it in the book of Ecclesiasticus, that I shall introduce the latter for the purpose of comparing them.

ECCLESIASTICUS, CHAP. XXIV.

Latin Version.	*Common English Version.*
3, 4, 5. Ego ex ore Altissimi prodivi, primogenita ante omnem creaturam; ego feci in cœlis ut oriretur lumen indeficiens, et sicut nebula texi omnem terram. Ego in altissimis habitavi, et thronus meus in columna nubis.	3. I came out of the mouth of the Most High and covered the earth as a cloud. 4. I dwell in high places and my throne is in a cloudy pillar. 5. I alone compassed the circuit of heaven, and walked in the bottom of the deep.
6, 7, 8, 9. Gyrum cœli circuivi sola et profundum abyssi penetravi; in fluctibus ambulavi, et in omni terra steti, et in omni populo; et in omni populo primatum habui. Et omnium excellentium et humilium corda virtute calcavi, et in his omnibus requiem quæsivi, et in hæreditate domini morabor.	6. In the waves of the sea and in all the earth, and in every people and nation I got a possession. 7. With all these I sought rest: and in whose inheritance shall I abide?

13. Quasi cedrus exaltata sum in Libano, et quasi cypressus in monte Sion.

14. Quasi palma exaltata sum in Cades, et quasi plantatio rosæ in Jericho. Quasi oliva speciosa in campis et quasi platanus exaltata sum juxta aquam in plateis.

16. Ego quasi terebinthus extendi ramos meos et rami mei honoris et gratæ.

17. Ego quasi vitis fructificavi suavitatem odoris, et flores mei fructus honoris et honestatis.

Ego mater pulchræ dilectionis et timoris et agnitionis et sanctæ spei. In me gratia omnis viæ et veritatis, in me omnis spes vitæ et virtutis.

19. Transite ad me omnes qui concupiscitis me, et generationibus meis implemini.

20. Spiritus enim meus super mel dulce et hæreditas mea super mel et favum.

13. I was exalted like a cedar in Libanus, and as a cypress-tree upon the mountains of Hermon.

14. I was exalted like a palm-tree in Engaddi, and as a rose-plant in Jericho, as a fair olive-tree in a pleasant field and grew up as a plane-tree by the water.

16. As the turpentine-tree I stretched out my branches, and my branches are the branches of honor and grace.

16. As the vine brought I forth pleasant savor, and my flowers are the fruits of honor and riches.

18. I am the mother of fair love and fear, and knowledge and holy hope: I, therefore, being external, am given to all my children, which are named of him.

19. Come unto me all ye that be desirous of me and fill yourselves with my fruits.

20. For my memorial is sweeter than honey and mine inheritance than the honeycomb.

"From the mouth of the Almighty I proceeded, the first-born of every creature. I caused a light which shall never be extinguished to appear in the heavens and covered the whole earth as with a fog. The highest places are my habitation and my throne is in a column of clouds. I alone have traversed the circumference of the heavens, I have descended to the depth of the abyss; I have walked in the waves; I have dwelt on every shore, among every people; and wherever I appear the nations own my sway. By my power I have subdued the hearts of the high and of the low; I have sought repose among them, but I will fix my abode only in the heritage of the Lord.....I tower aloft like a cedar on Mount Lebanon, and as the cypress

on the mountain of Sion. I am exalted as the palm-tree of Kadesh, and as the rose plants around Jericho. I am beautiful as the olive in the plains and majestic as the plane-tree in an open place by the fountain of water.....I have extended my branches as the turpentine-tree and they are the branches of honor and of grace. I put forth as the vine a sweet-smelling savor, and my flowers produce the fruits of honor and of integrity. I am the parent of holy love, of fear, of knowledge and of sacred hope. In me alone is found an easy road and truths which delight; in me alone reposes all the expectation of life and of virtue. Come to me all ye who love me, and my innumerable productions shall fill you with rapture; for my spirit is sweeter than honey and my distribution of it is far superior to that of the cells of the honeycomb."

This feeble translation is after a Latin prose version, itself a translation from the Greek and that from the Hebrew. It may therefore justly be presumed that it has lost, at least a portion of the beauties of the original. But such as it is, it still possesses charms and a sublimity of imagery superior to the verses of Lucretius, who seems to have borrowed from this passage his principal beauties. And here I shall dismiss this poet, the exordium of whose performance is a complete refutation of the system it was intended to establish.

Pliny takes a course directly opposite. At the very beginning of his natural history he says, there is no God, and he labours throughout the whole of his work to prove the existence of a Deity. His authority must be of considerable weight, because it is not that of a poet, to whom every opinion is indifferent, provided he can produce grand pictures; nor that of a sectary, determined to support a party, in opposition to the testimony of his conscience; nor, finally, that of a flatterer, paying his court to wicked princes. Pliny wrote under the virtuous Titus, and to that prince he has dedicated his work. He carries to such a height his love of truth and his contempt of the glory of

the age in which he lived, as to reprobate the victories of Cæsar in Rome, and in an address to a Roman emperor. He is replete with humanity and virtue. Sometimes he condemns the cruelty of masters towards their slaves, the luxury of the great and even the dissolute conduct of several of the empresses: at others he pronounces a panegyric on the virtuous, and exalts, even above the inventors of arts, those who distinguished themselves by their continence, their modesty and their piety. His work besides abounds with illumination. It is a real Encyclopædia, containing, as it ought, the history of the knowledge and of the errors of his time. The latter are sometimes imputed to him very unjustly, for he frequently introduces merely for the purpose of refuting them. But he has been calumniated by physicians and apothecaries, though they have extracted from him most of their prescriptions, because he finds fault with their conjectural art and their systematic spirit. He abounds, besides, in an uncommon degree of information, profound ideas, and curious traditions; and, what renders his work invaluable, his expressions are uniformly picturesque. With so much taste, judgment and knowledge, Pliny is an atheist. Nature, from whose bosom he derived all his intelligence, may address him in the words of Cæsar to Brutus: "And thou too my son!"

I love and esteem Pliny; and if I may venture to express my opinion, in justification of his immortal work, I think it has been falsified in the passage where he is made to reason as an atheist. All his commentators agree that no writer has been so ill used by transcribers as he; for we find copies of his natural history in which there are whole chapters entirely different. See, among others, what Mathiole says on the subject in his commentaries on Dioscorides. I shall here observe that the works of the ancients have passed to us through more than one unfaithful language; and what is still worse, through more than one suspicious hand. They have met with the fate of

their monuments, among which their temples have been the most degraded; their books have, in like manner, been mutilated in passages hostile or favorable to religion. This may be seen by Cicero's treatise *On the Nature of the Gods*, in which the objections against Providence are suppressed. Montaigne upbraids the first Christians for having suppressed part of the works of Cornelius Tacitus, on account of four or five articles contrary to our creed, "though," he adds, "his relation, the emperor Tacitus, had by express decrees furnished all the libraries in the world with copies of them."* In our own days, do we not see how each party destroys the reputation and the opinions of the party which opposes it? Mankind, between religion and philosophy, are in the same situation as the man in the fable, between two wives of different ages. Each took a fancy to trim his locks her own way; the younger carefully picked out all the grey hairs, which she did not like; the elder, for a contrary reason, removed all the black: the consequence was they completely stripped his head. Nothing can be a stronger demonstration of this ancient infidelity of the two parties, than what we read in the history of Flavius Josephus, cotemporary with Pliny. He is made to say, in as many words, that the Messiah was born, and he continues his narrative without mentioning this wonderful event in the whole course of his long history. How can it be supposed that Josephus, who frequently dwells on circumstances so minute and unimportant, should not have alluded a thousand times to a birth so interesting to his nation, since its destinies were involved in it, and even the destruction of Jerusalem was only one of the consequences of the death of Christ? He, on the contrary, perverts the meaning of the prophecies which announced him, and applied them to Vespasian and Titus for he, like the other Jews expected a triumphant Messiah. Besides, if Josephus had believed in Christ, would he not

* Essays, book 2, chap. 12.

have embraced the christian religion? For a similar reason is it credible that Pliny should commence his natural history with asserting that there is no God, and afterwards expatiate in every page, on the intelligence, the beneficence, the providence, the majesty of Nature, on the presages and omens sent by the Gods; and even on the miracles divinely operated by means of dreams?

We are likewise told of certain savage tribes who are atheists, and every corner of the globe has been explored in search of them. But obscure tribes are no more to be taken as examples for the whole human race, than obscure families among ourselves can be proposed as models to the nation; especially when the object is, to support, by authorities, an opinion, necessarily subversive of all society. These assertions are, besides, false: I have read the works of those voyagers from which they are extracted. They acknowledge that they had but a transient view of those people, and that they were ignorant of their languages. They concluded that they had no religion, because they saw no temples among them, as if any other temple were necessary to the belief in God, than the temple of Nature! These same travellers likewise contradict themselves, for they relate that these people, destitute of religion, salute the new and full moon, by prostrating themselves on the earth or by raising their hands towards heaven; that they pay respect to the memory of their ancestors and place food upon their tombs. The immortality of the soul, in whatever manner it is admitted necessarily supposes the existence of a God.

But if the first of all truths stood in need of the testimony of men, we might collect that of the whole human race, from geniuses the most exalted to people the most ignorant. This unanimous testimony is of the greatest weight, for no such thing can exist upon earth as a universal error.

Hear what the wise Socrates said to Euthydemus, who was endeavouring to convince himself of the existence of the Gods:

"You must be satisfied that I told you the truth, when I asserted the existence of Gods, and that man is an object of their peculiar care; but expect not that they will present themselves to your eyes; content yourself with beholding their works and with adoring them, and believe that it is in this manner they manifest themselves to mortals. For among all these Gods who are so liberal to us, not one renders himself visible to dispense his own bounty; and the great God himself who created the universe, and who upholds that vast fabric, all the parts of which are perfect in beauty and in goodness; he, who prevents them from growing old with time and causes them to subsist in immortal vigor,* he to whose will they yield implicit obe-

* Socrates had made Nature his particular study, and though his judgment, respecting the duration and preservation of her works is contrary to that of our philosophy, which considers the globe of the earth, in particular, as in a state of progressive destruction, it perfectly coincides with that of the holy scriptures which positively assure us that God upholds it, and with our own experience on the subject, as I have already shewn. We should not despise the physical knowledge of the ancients excepting in as far as it was purely systematical. We ought to recollect that they had made most of the discoveries, of which the moderns so highly boast. The Tuscan philosophers understood the art of conjuring lightning. The good king Numa made experiments on this subject. Tullus Hostilius was desirous to imitate him, but he fell a victim in the attempt, to his ignorance of the manner of conducting the experiment. (Consult Plutarch) Philolaus, the Pythagorean, asserted, long before Copernicus, that the sun was the centre of the universe; and before Christopher Columbus, that the earth was composed of two continents, that on which we are placed and another opposite to it. Several philosophers of antiquity maintained that comets were stars which had a regular course. Pliny himself says that they all move towards the north, which is generally true. Less than two centuries ago, it was, however, believed in Europe, that they were fires, kindled in the middle region of the air. It was still generally imagined at that time, that the sea furnished the waters of fountains and of rivers, by filtering through the earth, through the scriptures, in a hundred passages, declare that by the rains their sources are supplied. Of this we are now convinced by scientific observations on the evaporation of the sea. The monuments of architecture, sculpture, poetry, tragedy and history, transmitted to us by the ancients will ever serve as models to us. We are besides indebted to them for the invention of all the other arts, and it is fair to presume that those arts had as much superiority over ours as their liberal arts. As to the natural sciences, they have not left us any object of comparison; and the priests who made them their particular study carefully concealed the knowledge of them from the people. It is impossible to doubt that they possessed on this subject much more information than we. Consult the observations of the judicious Sir William Temple, on the magic of the ancient Egyptians.

dience, and that with a promptitude which surpasses our imagination; he, I say, is sufficiently visible in all those wonders of which he is the author. But our eyes vainly endeavour to penetrate to his throne, to contemplate him in his mighty operations; there he must be for ever invisible. Consider, for a moment that the sun, who seems to be exposed to the view of all, permits none to behold him steadily; and if any man has the rashness to attempt it, he is punished for his presumption with sudden blindness. Nay more; all the instruments employed by the Gods are invisible. The lightning issues from on high it destroys every thing it meets: but you cannot see it fall you cannot see it strike; you cannot see it return. The winds are invisible, though we behold the ravages they every day commit, and instantly feel their influence when they begin to blow. If there be any thing in man which partakes of the divine nature, it is his soul. There can be no doubt that it is this that directs, that governs him; nevertheless it cannot be seen. Learn therefore, from all this not to despise invisible things: learn to acknowledge their power in their effects, and to honor the Deity."*

Newton, who made such profound researches into the laws of Nature, never pronounced the name of God without taking off his hat and testifying the most devout respect. He loved to recal the sublime idea of the Deity, even in the midst of his pleasures, and he considered it as the natural bond of union among nations. Cornelius le Bruyn, the Dutch painter, relates, that "dining one day at his table, with several other foreigners, Newton proposed a health to the inhabitants of every region of the globe who believe in God." This was drinking to the health of the whole human race. It is possible that so many nations, of such different manners and languages, and in some instances of an intelligence so contracted, should believe in God, if that belief were the result of some tradition or profound meta-

* Xenophon's Memorabilia, book 4.

physical discussion? It is produced by the mere spectacle of Nature. A poor Arab of the desert, ignorant as most of his countrymen are, being one day asked how he was assured that there was a God, replied· "In the same manner as I know by the prints of feet in the sand, whether a man or a beast passed that way."†

It is impossible for man, as we have already observed, to imagine any form, or to produce any idea, of which the model does not exist in Nature. His reason is developed only on the reasons of Nature. A God must therefore exist, were it only for this, that man has an idea of him. But if we consider that every thing necessary to man exists with admirable adaptions to his wants, how much stronger are the reasons in favor of the existence of God, of him who is the universal bond which unites all the societies of the human race!

But I wish to know, how those, who doubt his existence on a survey of the works of Nature, would wish to be assured of it. Do they wish him to appear under a human form, and to assume the figure of an old man, as he is painted in our churches? They would say: "That is a man." Were he to clothe himself in some unknown and celestial form how could we support the sight of it in a human body? The full and unveiled display even of a single one of his works on earth would be sufficient to derange our feeble organs. If the earth, for example, turns round its axis, as we are told, what man could behold its motion from any given point of the heavens without trembling; for he would see rivers, seas and kingdoms whirling beneath him with a velocity almost thrice as great as that of a cannon ball. But even this rapidity of its diurnal rotation is nothing, for the rate at which it describes its annual circle, and carries us round the sun is sixty-five times greater than that of a cannon-ball. Were it possible for us only to see through our own skin the mechanism of

† Travels in Arabia by M. d' Arvieux.

our bodies we should be overwhelmed with terror. Durst we make a single movement if we beheld our blood circulating, our nerves pulling, our lungs blowing, our humors filtering, and all the incomprehensible assemblage of fibres, tubes, pumps, liquids and pivots which sustain a life at once so frail and so ambitious?

Could we wish, on the contrary, that God would manifest himself in a manner adapted to his nature by the direct communication of his intelligence, and without any intermediate mean between that and us?

Archimedes who was susceptible of such intense application as not to be disturbed in his meditations by the sacking of Syracuse, in which he perished, went almost distracted in consequence of the perception of a geometrical truth which suddenly presented itself to his mind. He was meditating, while bathing, on the method of discovering the quantity of alloy which a dishonest goldsmith had mixed in the golden crown of King Hiero; and having found it, from the analogy of the different weight of his body when in the water and out of it, he rushed out of the bath, naked as he was, and ran through the streets of Syracuse, crying, like a madman, "I have found it! I have found it!"

When some striking truth, or some affecting sentiment surprizes an audience at a theatre, you see some melted into tears, others almost choaked and deprived of the power of respiration, others, beside themselves, clappin their hands and stamping with their feet, women fainting away in the boxes. Were these violent agitations of the soul to continue only a few minutes, those who experinece them would lose their reason and perhaps their lives. What then would be the consequence, if the source of all truth and of all sensation were to communicate with us in a mortal body? He veils his intelligence from us under material forms and he inspires us with confidence relative to the movements of matter, by the sentiment of his intelligence. If he sometimes communicates himself to us in a

more intimate manner, it is not through the channel of our presumptuous sciences, but through that of our virtues. He manifests himself to the simple, and hides his face from the proud. "But," it is asked, "who made God? why should there be a God?" Ought I to doubt his existence, because I am incapable of conceiving his origin? The same reason would lead us to conclude that no such thing as man exists; for who made man? Why should there be men? Why am I in the world in the present century? Why was I not born in some of the preceding ages? Why shall I not be here in those that are to come? The existence of God is at all times necessary, and that of men is only contingent. Man is the only being whose existence appears superfluous in the order established by Nature on the earth. Many islands, affording the most enchanting abodes, from the disposition of the valleys, the waters, the forests and the animals, have been found uninhabited. Man alone deranges the plan of Nature; he diverts the course of fountains, he excavates the bowels of hills, he sets fire to forests, he massacres every thing that breathes; he every where degrades the earth, which could do very well without him. The harmony of this globe would be partially, perhaps entirely destroyed, were only the smallest genus of plants to be swept from its surface; for its destruction would leave a certain space of ground destitute of verdure, and the species of insect which found subsistence upon it without food. The annihilation of the insect would involve the destruction of the species of birds, which feed their young with it; and so on to infinity. The total ruin of the vegetable and animal kingdoms might arise from the destruction of a moss, as we may see that of an edifice begun by a crevice. But if the human race did not exist, we cannot suppose that any thing would be deranged; every stream, every plant, every animal would still be in its place. Philosophers indolent and haughty, who presume to enquire of Nature, why there should be a God, wherefore do you not rather demand why there should be men?

All his works speak of their author. The plain too extensive for the eye to embrace, and the capacious vault of heaven by which it is crowned, convey an idea of his immensity; the fruits suspended from the branches, within the reach of my hand, attest his providence; the voice of the tempest proclaims his power; the constant revolution of the seasons displays his wisdom. The various ways in which his bounty provides, in every climate, for the wants of all his creatures, the majestic port of the forest, the lovely verdure of the meadow, the grouping of the plants, the perfume and enamel of the flowers, an infinite multitude of harmonies known and unknown, are magnificent languages, which speak of him to all men, in a thousand and a thousand different dialects.

The very order of Nature is superfluous. God is the only being whom disorder invokes and whom our weakness announces. To acquire a knowledge of his attributes nothing more is necessary than a sense of our imperfections. O! how sublime is that prayer* so natural to the human heart, and which is still in use among people whom we denominate savages: "O eternal! have pity on me, because I am transitory; O infinite! because I am but an atom; O almighty! because I am weak; O source of life! because I am drawing near to the grave; O thou who seest all things! because I am in darkness; O all-bounteous! because I am poor; O all-sufficient because I am nothing!"

Man has conferred nothing on himself, he has received all. "He who planted the ear, shall he not hear? He who formed the eye, shall he not see? He who teacheth

* This prayer is to be found in the 44th chapter of Flacourt's *History of the Island of Madagascar*, encumbered it is true with many circumlocutions, but conveying the meaning which I have given to it. It is not a little surprising that Negroes should have discovered all the attributes of the Deity in the imperfections of man. It is with reason that the divine wisdom said of itself that it rested on all nations: "In every land, among every people I fixed my station, and obtained the chief place among the nations." *Eccles. chap.* xxiv. I think it probable, however, that this prayer is of Arabic origin, and appertains to the religion of Mohammed, introduced by that people into the island of Madagascar.

man knowledge shall he not know?" I should think that I was doing injustice to the understanding of the reader, and should derange the plan of my work were I still farther to enlarge here on the proofs of the existence of God. It remains for me to reply to the objection against his goodness.

There must be, we are told, a God of Nature and a God of Religion, since they have laws which are contradictory. This is just as if we were to assert that there is one God of metals, another of plants and a third of animals, because each of these classes has laws peculiar to itself. In all the kingdoms of Nature, the genera and species have again other appropriate laws which are sometimes in opposition to each other; but these different laws constitute the happiness of each species in particular , and they all concur in the most admirable manner in the general felicity.

The laws that govern man are derived from the same plan of wisdom which has contrived the universe. Man is not a being of a simple nature. Virtue, which is the great object of his existence on earth, is an effort which he makes against himself, for the good of mankind, in the view of pleasing God alone. It proposes to him, on the one hand, the divine wisdom as a model, and points out on the other, the unerring way to his own happiness. Study Nature, and you will perceive that nothing can be better adapted to the felicity of man, and that Virtue carries her reward with her, even in this world. A man's continence and temperance secure his health; contempt of riches and glory secures his repose; and confidence in God secures his fortitude. What can be more suitable for a creature so insignificant than modesty and humility! Whatever may be the revolutions of life, he has no fear of falling when he has taken his seat on the lowest step.

When we behold the abundance and the honors enjoyed by some bad men, let us not complain that God has made an unjust distribution of his gifts. Whatever on

earth is the most useful, the most beautiful and the best in its kind is within the reach of every man. Obscurity is better than glory, and virtue than talents. Sun-shine, a little field, a wife and children, are sufficient to afford a constant succession of pleasures. Must he likewise have luxuries?—a flower presents him colors more lovely than the pearl brought from the abysses of the ocean, and the blazing coal on his hearth diffuses a brighter lustre, and is undeniably more useful than the famous diamond glittering on the head of the Great Mogul.

After all, what did God owe to every man? The water of the spring, a few fruits, wool for clothing, as much land as he can cultivate with his own hands. So much for the wants of his body. As to those of his soul, it is sufficient for him to possess in childhood the love of his parents; in maturity the affection of his wife; in old age the gratitude of his children; in every period the goodwill of his neighbors, whose number is limited to four or five by the extent and form of his domain; a knowledge of so much of the globe as he can traverse in half a day, so that he may get home to his own bed at night, or at most of that portion which is bounded by his horizon; a sense of a Providence, which Nature bestows on all men, and which will spring up in his heart as well after he has made the circuit of his field, as after having circumnavigated the globe.

With these blessings and with this knowledge he ought to be content: all that he desires beyond them is above his wants and inconsistent with the distributions of Nature. He cannot acquire a superfluity but with the sacrifice of some necessary, public consideration, but by the loss of domestic happiness, and profound learning but by that of his repose. But those honors, those dependents, that wealth and that submission which so many seek to obtain are coveted unjustly, and are to be procured only by plundering and enslaving their fellow-citizens. The acquisition of them is attended with incredible labor and exertion, their possession with anxiety and their loss with regret

By these pretended blessings health, reason and conscience are ruined and corrupted. They are as fatal to empires as to families; it was neither by labor, nor by indigence nor by wars that the Roman empire was overturned, but by the pleasures, the luxury and the knowledge of the whole world.

The virtuous, indeed, are sometimes destitute not only of the blessings of society; but of those of Nature. To this I reply that their misfortune is frequently converted into an advantage. When persecuted by the world, they are commonly impelled to engage in some illustrious career, Affliction affords scope for great talents, or at least for great virtues, which are infinitely preferable. "It is not in your power," says Marcus Aurelius, "to be a naturalist. a poet, an orator, a mathematician, but you may, if you please, be a virtuous man, which is better than all." I have besides remarked, that no tyranny starts up, of any kind whatever, either in fact, or in opinion, but a rival instantly rises in opposition to counterbalance it, so tha virtue is protected by the very efforts which vice makes for its destruction. The good man it is true, frequently suffers; but if Providence came to his relief as soon as h needed it, Providence would be at his disposal: man woul. then have the command of God. In this case he would have no merit; but it seldom happens that the virtuous man does not sooner or later behold the downfall of his tyrants. Supposing the worst that can happen, that he becomes their victim, the period of all his misery is death. God owes man nothing. He called us from nothing; by again reducing us to nothing he restores us to that from which we were taken; we have no cause whatever of complaint,

Perfect resignation to the will of God ought under every circumstance to sooth the heart: but if the illusions of the world should ruffle the mind, let me suggest an argument capable of restoring its tranquillity. When any thing in the order of Nature disturbs us and would excite a mistrust

of its author, let us suppose an order contrary to that which galls us; we shall find this new hypothesis leading to a multitude of consequences, that would involve much greater evils than those of which we complain. We may employ a contrary method when we are seduced by some imaginary plan of human perfection. We need only to suppose its existence, and we shall behold innumerable absurd consequences springing out of it. This two-fold method, frequently employed by Socrates, rendered him victorious over all the sophists of his time, and may enable us to confute those of the age in which we live. It is at the same time a rampart which protects our feeble reason, and a battery which destroys all human opinion. To justify the order of Nature, it is sufficient to deviate from it; to refute all human systems nothing more is necessary than to admit them.

Men, for instance, complain of death, but were they not to die, what would become of their posterity? Long ere now, there would have been no room for the earth. Death is, therefore, a benefit. Men murmur at the necessity of labor, but were they not to labor, how would they spend their time? Those who are reputed happy, who have nothing to do, know not how to employ it. Labor, is, therefore, a benefit. Men envy beasts the instincts by which they are guided; but if like them, they knew from their birth all they are to know, what should they do in the world? They would pass through it without interest and without curiosity. Ignorance, is, therefore, a benefit. The other ills of Nature are equally necessary. Pain of body and affliction of mind by which the career of life is crossed, are barriers placed there by the hand of Nature to prevent our deviating from her laws. But for pain, bodies would be broken to pieces at the slightest shock, but for chagrin, so frequently the companion of our enjoyments, the mind would be depraved by every appetite. Diseases are the efforts of the constitution to expel some noxious humor. Nature employs them not to destr

body, but to preserve it. They are invariably the consequence of some infraction of her laws either physical or moral, and no other remedy is frequently required, than to suffer her to work in her own way. The regimen of aliments restores health of body, and that of men tranquillity of mind. Whatever may be the opinions which disturb us in society, they almost always vanish in solitude. Sleep alone dispels our chagrin more gently and more infallibly than a book of morals. If our afflictions are permanent and of such a nature as to rob us of repose, we may alleviate them by having recourse to God. This is the point to which all the paths of life converge. Prosperity invites us to approach him at all seasons, but we are compelled to it by adversity. It is the medium which God employs to constrain us to flee for refuge to him alone. Without this voice which addresses itself to every one of us, we should soon forget him, especially amid the bustle of cities, where so many fleeting interests clash with those which are eternal, and where so many secondary causes make us forget the first.

As to the evils of society they form no part of the plan of Nature; but these very evils demonstrate the existence of another order of things: for, is it natural to imagine, that the Being just and good, who has disposed every thing on the earth for the happiness of man, will permit him to be deprived of it with impunity? Will he do nothing in behalf of the virtuous and unfortunate man, whose study it has been to please him, when he has loaded with blessings so many miscreant who abuse them? After having displayed a gratuitous bounty, will he fail in executing necessary justice?

"But," we are told, "every thing dies with us. We must believe our own experience; we were nothing before we were born; we shall be nothing when we are dead." I adopt this analogy; but if I take my point of comparison from the moment when I was nothing, and when I first came into existence, what becomes of this argument? Is

it not a positive proof much stronger than all the negative proofs in the world? From the unknown past you draw conclusions concerning an unknown future, in order to perpetuate the nothingness of man; and I, for my part, deduce my consequence from the present which I know, to the future which I do not know, to convince myself of a future existence. I presume on a future goodness and justice, from the instances of goodness and justice which I now see diffused over the universe.

Besides, if we have, in our present state, nothing more than the desire and the presentiment of a future state, and if no one ever returned to give us information concerning it, the reason is, because a more sensible proof is not consistent with the nature of our life on earth. The evidence on this point must involve the same difficulties as that of the existence of God. Were we assured by some evident demonstration that a world to come exists for us, I am persuaded that all the pursuits of this world would, from that instant be abandoned. This prospect of divine felicity would throw us, even here below into a lethargic rapture. I recollect that, on my return to France in a vessel which had been on a voyage to India, as soon as the sailors perfectly distinguished the land of their native country, most of them became incapable of attending to the business of the ship. Some looked steadfastly at it, unable to take off their eyes; others dressed themselves in their best clothes, as if they had been that moment going on shore; some talked to themselves and others wept. As we approached, the disorder of their minds increased. As they had been absent some years, there was no end of their admiration of the verdure of the hills, of the foliage of the trees, and even the rocks on the shore, covered with sea-weed and mosses, as if all these objects had been perfectly new to them. The church-steeples of the villages in which they were born, which they distinguished at a distance up the country, and named one after the other, filled them with delight. But when the vessel entered the port, and they beheld

their friends, their fathers, their mothers, their wives and children, stretching out their arms towards them, weeping and calling them by their names, it was impossible to keep a single man on board; they all sprung on shore, and it became necessary, according to the custom of the port, to employ another set of mariners to work the ship into her moorings.

What then, would be the case, were we indulged with an actual view of that celestial country, inhabited by those who were most dear to us, and who alone are worthy of our highest affection. All the laborious and vain solicitudes of this life would be at an end. The passage from one world to the other being in every man's power, the barrier would quickly be overleaped: but Nature has involved it in obscurity, and has planted doubt and terror to guard the pass.

It would appear, say some, that the idea of the immortality of the soul could only have arisen from the speculation of men of genius, who, contemplating the combination of the universe, and the connection which present scenes have with those which preceded them, have thence concluded the existence of a necessary connection with futurity: or, that this idea of immortality was introduced by legislators into polished societies, as a distant hope tending to console mankind for their political injustice. But if this were the case, how could it have found its way in the midst of deserts into the head of the negro, the Caraib, the Patagonian, the Tartar? How could it have been diffused alike in the islands of the South Sea, and in Lapland; in the voluptuous regions of Asia, and in the rude climes of North America, among the natives of Paris and those of the New Hebrides? How have so many nations, separated by vast seas, so different in manners and in language, unanimously adopted one and the same opinion, while they frequently affect, from national animosity a deviation from the most trivial custom of their neighbors? All of them believe in the immortality of the soul. Whence could they have

derived an opinion so positively contradicted by their daily experience? They see their friends die every day, but the day never comes when they behold them appear again. In vain do they carry food to their tombs, in vain do they suspend, weeping from the neighboring trees, the objects which they hold most dear; neither these testimonies of inconsolable friendship, nor the vows of conjugal affection, challenged by their afflicted mates, nor the cries of their children, bathing with their tears the turf which covers their relics, are able to recal them from the land of spirits. What do those expect for themselves from another life who express all this unavailing regret? There is no prospect so contrary to the interest of most men: for some, having lived by violence or by fraud, have reason to apprehend future punishments; others having been oppressed in this world, are led to fear least the life to come should be ruled by the same destiny as that which they must shortly leave. Can it be asserted that it is pride which cherishes this opinion in their bosoms? Is it pride that induces wretched negro in our colonies to hang himself in th hope of returning to his own country, where slavery must again await him? Other nations, as the natives of Otaheite, confine the hope of this immortality to the renewal of a life precisely the same as that which they have already led. Ah! the passions present to man different plans of felicity: and the miseries of his existence and the illumination of his reason would long ago have destroyed his happiness, had not the hope of a future life been, in his bosom the result of a natural sentiment.

But why is man the only one of all animals subjected to other evils besides those of Nature? Why has he been abandoned to himself, since he is so liable to go astray? He must be the victim of some malignant Being.

It is the province of Religion to take us up where we are left by philosophy. The nature of our evils discloses their origin. If man renders himself unhappy, it is because as would himself be the arbiter of his felicity. Man is

god in a state of exile. The reign of Saturn, the golden age, Pandora's box, from which issued every evil, while nothing but hope remained at the bottom, and a thousand allegories of a similar nature diffused over all the nations of the globe, attest the happiness and fall of the first of men.

But there is no occasion to have recourse to external testimonies; we carry within ourselves the most unquestionable evidence. The beauties of Nature attest the existence of a God, and the miseries of man confirm the truths of religion. Not a single animal exists but what is lodged, clothed, fed by the hand of Nature, without care and almost without labor. Man alone, from his very birth, is overwhelmed with calamity. In the first place he i born quite naked, and with so little instinct, that if the mother who bore him were not to rear him for several years, he would perish of hunger, of heat, or of cold. He knows nothing, but from the experience of his parents. They are under the necessity of providing for him a lodging, of making his clothes, and preparing his food at least for eight or ten years. Whatever praises may have been lavished on certain countries for their fecundity and the mildness of their climate, I know of none, in which subsistence of the simplest kind may be procured by man without labor, or anxiety. In India he must have a roof to shelter him from the heat, the rain and insects; he must cultivate rice, weed it, thresh it, shell it and dress it. The banana, the most useful of all the vegetables of those regions, requires to be watered and surrounded with fences, to secure it at night from the attacks of wild beasts. Magazines must likewise be constructed for the preservation of provisions, during the season when the earth produces nothing. When man has thus collected around him all that is necessary to a life of tranquillity and comfort, ambition, jealousy, avarice, gluttony, incontinence, or languor take possession of his heart. He almost always perishes the victim of his own passions. To have sunk thus below

the level of beasts man must undoubtedly have attempted to raise himself to an equality with the Deity.

Wretched mortals! seek your happiness in virtue, and you will have no reason to complain of Nature. Despise that vain knowledge, and those prejudices which have corrupted the earth and which every age destroys in its turn. Love the laws which are eternal. Your destiny is not abandoned to chance nor to malignant spirits. Call to mind the times, the recollection of which is still fresh among all nations; the animals every where found the means of supporting life, man alone was destitute of food, of clothing, of instinct. Divine wisdom left him to himself, in order to bring him back to God. She scattered her blessings over the whole earth, that, to collect them, he might explore every region, that he might unfold his reason by the inspection of her works, and that he might become enamoured of her from a sense of her benefits. She placed between herself and him innocent pleasures, enchanting discoveries, pure joys and endless hopes, to lead him to herself, step by step by the path of knowledge and of happiness. She placed on each side of his way fear, languor, remorse, pain, and all the ills of life, as barriers to prevent his deviating from it and losing himself. Thus a mother scatters fruit on the ground to teach her child to walk; she keeps at a little distance, she smiles, she holds out her arms; but if he happens to fall, she flies to his assistence, she dries his tears and comforts him. In the same manner Providence affords relief to man by a thousand extraordinary means which she employs to supply his wants What would have become of him in the earliest ages, if she had abandoned him to his reason when still unaided by his experience? Where did he find the grain, which now affords nourishment to so many nations, and which the earth, teeming spontaneously with every other species of vegetable production, no where exhibits? Who taught him agriculture, an art so simple that the most stupid of mankind is capable of learning it, and so sublime that the

most intelligent of animals cannot practise it? There is scarcely any animal but what subsists upon vegetables, but what has daily experience of their reproduction, and employs, in quest of those adapted to it, more combinations than would be necessary for sowing them. But on what did man himself subsist before an Isis or a Ceres revealed to him this blessing of heaven? Who shewed him at the beginning of the world, the first fruits of the orchard dispersed in the forests, and the alimentary roots concealed in the bosom of the earth? Must he not have died a thousand times of hunger, before he had collected a sufficient quantity for his subsistence, or of poison before he had learned to select, or of fatigue and restlessness before he had formed around his habitation grass-plots and bowers? This art, the image of creation, was reserved only for that being on whom was stamped the impression of the Deity. If man when he issued from the hands of his creator, had been left by Providence to himself, what would have become of him? Could he have said to the regions extended before him: "Ye unknown forests, show me the fruits destined to be my portion. Open, thou earth, and disclose to me in thy roots my allotted aliments! Ye plants, on which my life depends, manifest yourselves to me and supply the want of that instinct which Nature has denied me! Could he have had recourse, in his distress to the compassion of brutes, and have said to the cow, when perishing of hunger: "Receive me into the number of thy children, and let me partake of the produce of one of thy superfluous teats?" When the breath of the north wind made him shiver with cold, did the wild goat and the timid sheep run to him to warm him with their fleeces? When wandering without a protection and a retreat, he heard at night the howling of wild beasts demanding their prey, did he supplicate the generous dog and say to him: "Be my defender, and I will make thee my slave?" Who could have subjected to his authority so many animals, who stood in no need of him, who surpassed him in cunning, in speed,

in strength, if the hand, which notwithstanding the fall, destined him for empire, had not bowed their heads to his will?

How has it been possible for him with a reason less infallible than their instinct, to raise himself up to the very skies, to measure the courses of the stars, to traverse oceans, to command the lightning, to imitate most of the productions and phenomena of Nature? These things now fill us with astonishment; but I am much more astonished that a sense of the Deity should have spoken to his heart, long before the knowledge of the works of Nature had perfected his understanding. Behold him in a savage state, in perpetual war with the elements, with ferocious beasts, with his fellow-creatures, with himself, frequently reduced to a servitude which no animal could endure; and he is the only being that manifests, even in the depth of misery, the character of infinity and a solicitude for immortality. He erects trophies, he engraves his exploits on the bark of trees; he celebrates funeral obsequies, he reverences the ashes of his ancestors from whom he has received such a fatal bequest. He is incessantly agitated by the passions of love or revenge: when he is not the victim of his fellow-men, he is their tyrant: and he alone knows that justice and goodness govern the world and that virtue exalts man to heaven. He receives from his cradle no present from Nature, no soft fleece, no plumage, no protection, no tool for a life so painful and laborious; and he is the only being that invites the Gods to his birth, to his nuptials and to his funeral ceremonies. However he may have been led astray by extravagant opinions, when he is overtaken by any unexpected burst of joy or grief, his soul by an involuntary movement, takes refuge in the bosom of the Deity. "Ah! my God!" he exclaims, raising towards heaven is suppliant hands and eyes bathed with tears looking there for a father. Ah! the wants of man attest the Providence of a supreme being. He has made man feeble and ignorant, only that he may support

himself on his strength, and enlighten himself by his wisdom; and so far is it from being true, that chance or malignant spirits rule over a world where every thing concurs to destroy a creature so miserable, his preservation, his enjoyments and his empire prove, that in every age, a beneficent God has been the friend and the protector of human life.

STUDY IX.

OBJECTIONS AGAINST THE METHODS OF OUR REASON AND THE PRINCIPLES OF OUR SCIENCES.

At the very beginning of this work I displayed the immensity of the Study of Nature. I there proposed new plans to enable us to form an idea of the order which she has established in all the kingdoms; but checked by my incapacity, I could not presume to promise any thing more than to trace that which exists in the vegetable order. However, before I proceeded to establish new principles on this subject, I thought it incumbent upon me to refute the prejudices which the world and our sciences themselves might have diffused over Nature in the minds of my readers. I have, therefore, stated, the benefits conferred by Providence on the age in which we live, and the objections which have been raised against it. I have replied to these objections in the same order in which I stated them, pointing out, as I proceeded, the wonderful harmony prevailing in the distribution of the globe, abandoned, as some imagine to the simple laws of motion and of chance: I have presented a new theory of the causes of the tides, of the motion of the earth in the ecliptic and

of the universal deluge. I shall now attack, in my turn, the methods of our reason and the elements of our sciences, before I lay down some principles which may point out to us a path leading infallibly to Truth.

If, however, in the course of this work, and particularly in this article, I attack our natural sciences, it is only so far as system is concerned; I do them justice on the score of observation. Besides, I entertain a high respect for those who devote themselves to their cultivation. I know nothing in the world more deserving of esteem, after the virtuous man, than the man of science; if it be possible to separate the sciences from virtue. What sacrifices and privations does not the study of them require! While the herd of mankind is acquiring riches and honors by agriculture, commerce, navigation and the arts, very often those who have cleared the way for them, have lived in penury, disregarded by their contemporaries. The man of science, like the torch, illumines all around him and remains himself in obscurity. I have not, then, attacked either men of science whom I respect, or the sciences which have been the consolation of my life: but, had time permitted me, I would have disputed every inch of ground with our methods and our systems. They have plunged us into such a number of absurd opinions in every branch of science, that I have no hesitation to affirm, that our libraries at this day contain more of error than of information Nay I would lay any wager, that were a blind man introduced into the national library, and suffered to take out any book at random, the first page of that book which he should chance to open would contain an error. How many probabilities should I not have in my favor, among the romance-writers, poets, mythologists, historians panegyrists, moralists, and natural philosphers of past times and the metaphysicians of all ages and of all countries! There is indeed a very simple method to check the evil which their opinions might produce; it is, to place all the books which contradict themselves beside each other; and as

they are almost innumerable in every walk of literature, the result of human knowledge would be reduced almost to nothing.

It is our methods that lead us astray. To succeed in the search of truth, we ought, in the first place, to be free from all passion; and yet our passions are excited from our very infancy, and they are the first agents to give an improper bias to our reason. "Make your fortune," is the maxim laid down as the fundamental basis of our actions and of our opinions. The consequence of this is that we no longer discover any thing but what has some relation to this desire. Even natural truths vanish from our sight, because we contemplate Nature only in machines or in books. To produce a belief in God, it is necessary that some person of importance should assure us that there is one. If Fenelon tells us so we believe it, because Fenelon was preceptor to the duke of Burgundy, an archbishop, a man of quality and addressed by the title of My Lord. We are fully convinced of the existence of God by the arguments of Fenelon, because his credit reflects some on ourselves. I mean not, however, to affirm, that his virtue does not give some degree of authority to his demonstrations, but no farther than as it is connected with his reputation and his fortune; for were we to meet with the same virtue in a shoe-black, it would dwindle away to nothing in our eyes. In vain would such a one produce proofs of the existence of God, stronger than all the speculations of philosophy, in a life subject to contempt, hardship, poverty, exhibiting uniform probity and fortitude, and in a perfect resignation to the will of the supreme being; these testimonies so positive are of no weight with us; we think them of no importance but when they acquire celebrity Let some emperor adopt the philosophy of this obscure man, his maxims will be praised in every book and quoted in every thesis: the author's portrait will be engraved, and his bust, in plaister of Paris will decorate every chimney-piece: he will be another Epictetus, Socrates or J. J

Rousseau. But if an age arrive, in which should arise men possessing as high reputation as these, honored by powerful princes, who have reason to wish that there was no God, and who, in order to pay court to such princes should deny his existence; from the same effect of our education which caused us to believe in God on the faith of a Fenelon, an Epictetus, a J. J. Rousseau, we should renounce our belief, on the faith of men of equal reputation and besides so much nearer to us. Such is the influence of our education; it disposes us alike to preach the Gospel or the Coran, according as our interest is concerned.

Hence arose that maxim so universal and so pernicious *Primo vivere deinde philosophari;* "To live first and to seek wisdom afterwards." Every man who is not ready to sacrifice his life to obtain wisdom is not worthy of knowing her. The sentiment of Juvenal is much more just:

> Summum crede nefas vitam præferre pudori,
> Et propter vitam, vivendi perdere causas.

"Think it the blackest of crimes to prefer life to honor, and for the sake of life to sacrifice that which renders it desirable."

I say nothing of other prejudices which oppose the investigation of truth, such as those of ambition, which stimulate each of us to distinguish himself; and this can scarcely be done but by two ways, either by subverting maxims the most true and the most firmly established, in order to substitute our own in their stead; or by endeavouring to please all parties and reconciling the most contradictory opinions: which conduct, in either case, multiplies to infinity the ramifications of error. Truth has, besides, a multitude of other obstacles to encounter on the part of powerful men who derive advantage from error. I shall confine myself to those which are to be ascribed to the weakness of our reason and shall examine their influence on the branches of the science of Nature.

It is easy to perceive that most of the laws we have assigned to Nature, have been deduced from our weakness and others from our pride. I shall state a few instances, at random, from among those which we consider as the most certain. We have conceived, for example, that the sun must be in the centre of the planets, to direct their motion, because we are obliged to place ourselves in the centre of our concerns to keep an eye over them. But if, in the celestial spheres, the centre naturally belongs to the most considerable bodies, how happens it that Saturn and Jupiter, which far surpass our globe in magnitude, should be at the extremity of our vortex?

As the shortest way occasions the least fatigue, we have likewise concluded, that this must be the plan adopted by Nature. Accordingly, to spare the sun a journey of ninety millions of leagues, which he would be obliged every day to perform in order to give us light, we have made the earth turn round on its axis. It may be so; but if the earth revolves round itself, there must be a great difference in the space traversed by two cannon-balls, fired at the same time, one eastward and the other westward; for the first proceeds with the motion of the earth, and the second goes in an opposite direction. While both are in the air, and flying from each other, at the rate of six thousand fathoms in a minute, the earth, during that same minute, is outflying the first and removing from the second, with a velocity which moves it along at the rate of sixteen thousand fathoms; which must carry the ball flying to the west, twenty-two fathoms forward, and that discharged towards the east, ten thousand fathoms backward, from the point of their departure.

I once submitted this objection to an able astronomer, who almost considered it as an affront. He replied, according to the custom of our doctors, that it had been made long ago and answered. At length, when I intreated him to have compassion on my ignorance, and to give me some solution, he mentioned the pretended experiment of

a ball dropped from the mast-head of a ship under sail, and which, notwithstanding the progressive motion of the vessel, falls on the deck close to the mast. "In like manner," he continued, "the earth carries along the two balls in its rotary motion. If they were discharged in a perpendicular direction, they would fall on the very spot from which they set out." As axioms cost nothing, and serve to cut short all kinds of difficulties, he added the following: "The motion of a large body absorbs that of a small one." "If this axiom be true," replied I, "the ball dropped from the mast-head of a ship under sail, should not fall close at the foot of the mast; its motion ought to be absorbed, not by the motion of the vessel, but by that of the earth, which is a much greater body. It ought to obey only the direction of gravity; and for the same reason the earth ought to absorb the motion of the ball discharged toward the east, and force it back into the cannon from which it issued.

I was unwilling to push this difficulty any farther; but I remained, as has frequently been the case, after the most luminous solutions of our schools, still more perplexed than before. I began to doubt the truth not only of a system and of an experiment, but what is worse, of an axiom. Not that I reject our planetary system, such as it is given us; but I submit to it for the reason which probably suggested it; because it is best adapted to the weakness of my body and of my mind. I think, indeed, that the rotation of the earth saves the sun every day a prodigious journey; but in other respects I cannot, by any means, think that this is the system of Nature, and that she has revealed the causes of the motion of the stars to men who are ignorant how the movement of their own fingers is effected.

I have subjoined some farther probabilities in favor of the sun's motion round the earth. "The astronomers of Greenwich," says the *Courier de l'Europe*, Friday, May the 4th, 1781, "having discovered that a star of Taurus has a declination of two minutes every twenty-four hours

which star not being nebulous, and having no train, cannot be considered as a comet, have communicated their observations to the astronomers of Paris, who have found them accurate. M. Messier is to make a report on the subject to the Academy of Sciences, at their next meeting."

If the stars are suns, here then is a sun which moves; and that motion must be a presumption in favor of the motion of ours.

It may, on the other hand, be presumed that the earth is stationary, for this reason, that the distance between the stars never changes with respect to us, which it necessarily must, in a very perceptible manner, if, as it is asserted, we traversed annually a circle in the heavens one hundred and ninety-two millions of miles in diameter; for in a space so vast we should approach nearer to some, and remove farther from others.

One hundred and ninety-two millions of miles dwindle, we are told, to a point in the heavens, when compared to the distance of the stars. I doubt the truth of this assertion. The sun, which is a million times larger than the earth, has an apparent diameter of only six inches at the distance of ninety-six millions of miles from us. If this distance reduces a body so immense to a diameter so small, it cannot be doubted that one hundred and ninety-two millions of miles would diminish it much more, and reduce it perhaps to the magnitude of a star; and it is not improbable, that on being thus diminished, if we were to be removed to double that distance, it would entirely disappear. How then, does it happen, that when the earth approaches so much nearer to the stars, or removes so much farther from them, in performing its annual circle, none of these stars increases or diminishes in size with respect to it?

The following additional observations will tend to prove at least, that the stars have movements peculiar to themselves. The ancient astronomers observed in the neck of the whale a star which varied much in its appearances

sometimes it appeared for three months together, sometimes during a still longer interval; sometimes it seemed larger, and sometimes smaller. The time of its appearance was irregular. The same astronomers relate, that they saw a new star in the heart of the Swan, which disappeared from time to time. In 1600, it was equal to a star of the first magnitude, it gradually diminished, and at length disappeared. M. Cassini perceived it in 1655. It continued increasing five years successively; it then began to diminish, and was not seen again. In 1670 a new star was discovered near the head of the Swan. It was observed by Father Anselm, a Carthusian friar, and by several astronomers. It disappeared, and again became visible in 1672. From that period it was not seen again till 1709, and in 1713 it totally disappeared.

These examples demonstrate that the stars not only have motions, but that they describe curves very different from the circles and the ellipses which we have assigned to the celestial bodies. I am persuaded that there is among their movements the same variety as among those of several bodies on the earth, and that there are stars which describe cycloids, spirals and many other curves of which we hav not so much as an idea.

I shall say no more on this subject lest it should appear that I was better informed respecting the affairs of the heavens, than of those which are much nearer to us. I had no other design than to state here my doubts and my ignorance. If the stars are suns, there must then be suns in motion, and ours may surely move as well as they.*

* I now leave the reader to reflect on the total disappearance of those stars. The ancients observed seven stars in the Pleïades; six only are now visible. The seventh disappeared at the siege of Troy. Ovid says it was so deeply affected with the fate of that unfortunate city, as, from grief to cover its face with its hand. I find in the book of Job, a curious passage which seems to predict the disappearance. It is chap. 38, v. 31. *Numquid conjungere valebis micantes stellas Pleïadas, aut gyrum Arcturi poteris dissipare?* Wilt thou be able to join together the brilliant stars of the Pleïades, or to turn the Bear from its course? Such is the purport of the translation of M Lemaitre de Saci. If, however, I may be allowed to hazard an

It is thus that our general maxims become sources of error; for we never fail to charge with disorder whatever seems destitute of our pretended order. That which I have already quoted, namely, that Nature, in her operations, takes the shortest way has filled our physics with a multitude of false ideas. There is nothing, however, which experience more positively contradicts. Nature commands the currents of rivers to meander through the land, instead of flowing in a straight line: she causes the veins to make large circuits in the human body, and has even perforated certain bones, expressly that some of the principal ones might pass through the interior of members to prevent their being exposed to injury from external percussions. Lastly, she expands a mushroom in a night, and takes a century to bring an oak to perfection. Nature rarely takes the shortest way, but she always chuses that which is most suitable to her purpose.

This rage for generalizing has generated, in every branch of science, an infinite number of maxims sentences, adages, which are perpetually contradicting each other. According to one of our maxims a man of genius catches every thing at a glance and executes all with a single law. For my part, I consider this sublime method of observing and of executing as one of the strongest proofs of the weakness of the human mind. Men cannot proceed with confidence but where there is only one single path. When several present themselves, he becomes perplexed, and is at a loss which to chuse; that he may make sure of not deviating, he admits but one of them to be right, and when he has once entered, pride prevents him from receding. The author of Nature, on the contrary, embracing in his infinite intelligence all the spheres of beings, proceeds to their production by laws as various as his own inexhaustible concep-

opinion after that learned man, I should give a different signification to the conclusion of this passage. *Gyrum Arcturi dissipare*, means, I conceive, to dissipate the attraction of the arctic pole. I shall here repeat what I have already observed, that the book of Job is replenished with the most profound knowledge of Nature

tions, in order to attain one single end, which is their general good. Whatever contempt philosophers may entertain for final causes, it is such only that he permits us to know. All the rest he has concealed from us, and it is well worthy of remark that the only end which he discloses to our understanding is the same that he holds forth to our virtues.

One of our most usual methods, when we seize any effect in Nature, is first to dwell upon it from weakness, and then to deduce from it a universal principle out of vanity. If afterwards we can find means, and that is not difficult, to apply to it a geomterical theorem, a triangle, an equation, if it be but an $a \times b$ this is sufficient to render it venerable for ever. It was thus that in the last century every thing was explained by the corpuscular philosophy, because it had been discovered that certain bodies were formed by intus-susception, or by the aggregation of parts. A seasoning of algebra added to it, gave it so much the more dignity, as most of the reasoners of those times understood nothing of the matter. But as this philosophy was not well endowed, its duration was not long. At the present day we do not even mention the names of a multitude of learned and illustrious characters, whom all Europe was at that time covering with laurels.

Others, having found that the air had pressure, set to work with every kind of machine, to prove that it possessed gravity. Our books have referred every thing to the weight of the air, vegetation, the temperament of man, digestion, the circulation of the blood, the ascension of fluids and other phenomena. They found themselves, it is true, a little embarrassed by capillary tubes, in which water ascends independently of the action of the air. But an explanation was found for this likewise, and in the style of certain writers, woe betide those who cannot understand it. Others applied themselves to the examination of its elasticity, and by this quality of the air have explained equally well all the operations of Nature. Each cried out

in his turn: the veil is removed; we have caught her in the fact. But did not the savage when walking against the wind, know that the air possesses both gravity and elasticity? Did he not avail himself of both these qualities in the management of his canoe when under sail? I do not object to the application of natural effects, accurately calculated and ascertained, to the necessities of life, but in general they are employed to regulate the operations of Nature and not her own.

Others again find it much more convenient to explain the system of the universe without deducing from it any consequence. They assign to it laws which have such accuracy and precision, that they leave divine providence nothing to do. They represent God as a geometrician or a mechanic who amuses himself with making spheres merely for the pleasure of setting them in motion. They pay no attention to harmonies and other intelligent causes. Though the accuracy of their observations may do them honor, their results are very far from being satisfactory. Their manner of reasoning concerning Nature resembles that of a savage, who, observing in one of our cities the motion of the hand of a public clock, and taking notice that when it arrived at certain points on the hour-plate, the bells fall a ringing, the people issue from the houses, and a great part of the inhabitants are put in motion, should imagine that a clock is the principle of all the occupations of Europeans. This is the defect which may be imputed to most of the sciences, which, without consulting the end of the operations of Nature, study only the means. The astronomer contemplates only the courses of the stars, without paying any attention to the relations which they have with the seasons. The chemist, having discovered in the aggregations of bodies, particles, such as salts, which mutually assimilate, sees nothing but salts as the principal and as the end. Algebra having been invented to facilitate calculation, has been converted into a science which calculates only imaginary magnitudes, and proposes to it-

self nothing but theorems inapplicable to the necessities of life.

From all this have resulted an infinite multitude of disorders of greater magnitude than I am able to express. The view of Nature, which, to nations the most savage, suggests not only the idea of a God, but that of an infinity of gods, presents to our philosophers the idea of furnaces, of spheres, of stills and of crystallizations. The Naïads, the Fauns, Apollo, Neptune, Jupiter, at least, impressed the ancients with some respect for the works of the creation, and likewise attached them to their country by a sentiment of religion. But our machines destroy the harmonies of Nature and of society. To us the former is nothing but a gloomy theatre, composed of levers, pulleys, weights and springs, and the latter merely a school for disputation. These systems, we are told afford exercise to the mind. It may be so; but do they not mislead the understanding? Do they not corrupt the heart? While the head is establishing principles, the heart is deducing consequences. If every thing is the work of powers destitute of intelligence, of attractions, fermentations, the play of the fibres and masses, we must submit to their laws, like all other bodies. Women and children deduce these conclusions. What, then, becomes of virtue? We must obey, we are told, the laws of Nature. So then in obedience to the law of gravity, we must sit down and not stir! Nature speaks to us with an hundred thousand voices. And which of these instructs how to act? Shall we regulate our lives by the example of the fishes, the quadrupeds, the plants, or even of the celestial bodies?

There are on the contrary metaphysicians, who, regardless of every law of physics, explain to you the whole system of the world with abstract ideas. But what proves that their system is not the system of Nature, is this, that, with their materials and their method, it is extremely easy to overturn their order, and with very little trouble to form one totally different. This gives rise to a reflection

calculated to humble in the dust all the pride of human understanding, namely, that all the efforts of the genius of man, so far from being able to construct a world, are incapable of putting in motion a single grain of sand.

There are others who consider the state in which we live as a state of ruin and punishment. They suppose, conformably to the sacred authorities, that this earth once existed with other harmonies. I admit all that scripture says on this subject, but not the explanations of commentators. Such is the weakness of our understanding, that we cannot conceive or imagine any thing beyond what Nature actually exhibits to us. They are therefore grossly mistaken, when they tell us, for example, that when the earth was in a state of perfection, the sun was constantly at the equator; that the days and nights were equal; that there was a perpetual spring; that the surface of the ground was smooth and level, &c. Were the sun constantly at the equator, I doubt whether a single spot of the globe would be habitable. In the first place, the torrid zone would be burnt up by his fervent heat, as we have already demonstrated; the two frigid zones would extend much farther than they do at present; the temperate zones would be at least as cold towards their middle, as they are at the vernal equinox, and this temperature would prevent most of the fruits from coming to maturity. I know not where spring would be, but if it were perpetual in any country, never could autumn exist there likewise. The case would be still worse were there neither rocks nor mountains on the surface of the globe, for not a river or stream could then flow upon the earth. There would be neither shelter nor reflection to the north to cherish the germination of plants, and there would be neither shade nor humidity to preserve them from the heat. These admirable arrangements actually exist in Finland, in Sweden, in Spitzbergen, and in all the northern regions, which have the more rocks, the higher the latitude under which they lie: and they are found in like manner, in the Antilles, in the Isle of France

and in all the islands and countries situated between the tropics, the face of which is covered over with rocks, especially towards the Line, in Ethiopia, whose territory Nature has overspread with vast, lofty rocks, almost perpendicular, forming around them deep vallies, shady and cool. Thus, as we have already observed, to refute our pretended plans of perfection, it is sufficient to admit them.

There are other men of science, on the contrary, who never deviate from their track, and who refuse to see any thing beyond it, however rich it may be in facts: such are the botanists. They have observed several parts in plants, and they are wholly employed in collecting and arranging them according to the number of these parts, without taking the trouble to make themselves acquainted with any thing farther. When they have classed them in their heads and in their herbals, into umbellated, rosiform and tubulous, with the number of their stamina; if to this they are able to affix a few Greek names, they fancy themselves possessed of the whole system of vegetation.

Others among them, indeed, go somewhat farther. They study the principles of plants, and to attain this object they pound them in mortars or decompose them in stills. When the operation is finished, they shew you salts, oils, earths, and tell you, these are the principles of such and such a plant. For my part, I no more believe that it is possible to shew the principles of a plant in a phial, than those of a wolf, or a sheep in a stew-pan. I respect the mysterious operations of chemistry, but when it acts upon vegetables, it destroys them. I shall quote the opinion which an able physician has pronounced on his own experiments, I mean Dr. J. B. Chomel in the preliminary discourse to his useful abridgment of the history of common plants. "Nearly two thousand analyses of different plants," says he, "made by the chemists of the Royal Academy of Sciences have taught us nothing, unless it be this, that from all vegetables

may be extracted a certain quantity of acid liquors, more or less essential or fetid oil, fixed salt, volatile or concrete, insipid phlegm, and earth; and they frequently obtain nearly the same principles, and in the same quantity, from plants whose qualities are extremely different. Thus this very tedious and very troublesome operation has been a useless attempt to discover the effects of plants, and has served only to undeceive us respecting the prejudices that might have been entertained in favor of such analyses." He adds, that the celebrated chemist Homberg, having sown the seeds of the same plants in two boxes filled with earth impregnated with a strong alkaline ley, one of which was afterwards watered with common water and the other with water in which nitre had been dissolved, the plants yielded nearly the same principles. Here then our systematic science is completely overturned; for it is incapable of discovering the essential qualities of plants either by their composition, or by their de-composition.

Many other errors relative to the laws of their expansion and fecundation have been adopted. The ancients discovered in many plants males and females, and a fecundation by means of the emanations of the seminal powder, as in the date-tree. We have applied this law to the whole vegetable kingdom. It embraces, indeed, a very wide compass: but how many vegetables are propagated by slips, by suckers, by creeping shoots, by the extremities of their branches! Here are then, in the same kingdom several modes of re-production. Nevertheless, when we do not perceive in Nature the law we have once adopted in our book, we ascribe it to some deviation on her part. We have only one thread, and when it breaks, we imagine that the system of the universe is on the point of dissolution. The supreme intelligence disappears from before our eyes, as soon as our own is a little disturbed. I, however, entertain no doubt, that the author of Nature has established laws of the vegetable kingdom, now so generally studied, which are still unknown to us I annex an

observation on this subject, which I submit to the experience of my readers.

Having transplanted, in the month of February, 1783, some plants of the common violet which had begun to push out small buds for flowers, this transplantation checked their development in a very extraordinary manner. These small buds never flowered, but their ovary having swelled, attained the usual size, and changed into a capsule filled with seeds, without exhibiting either internally or externally either petal, anther, stigma, or any part whatever of the flower. I only perceived in the growing buds which I opened, the parts which have composed the flower, withered within the calix. I sowed their seed which had not been fecundated, but it never came up. This experiment is favorable to the Linnæn system in one respect, but deviates from it in another, as it demonstrates that a plant may produce fruit without flowering.

It may here be proper to remark, that the physical laws are subordinate to the laws of utility, that is, for example, the laws of vegetation are subordinate to the preservation of sensible beings, for which they were made. Accordingly, though the flowering of my violet was interrupted, this did not prevent the production of its seed, for subsistence of some animal whose food it is. For this reason, the most useful plants, as the gramineous, are those which have the greatest variety of methods of reproducing themselves. If Nature had confined herself with regard to them to the law of flowering, they would not multiply when pastured upon by animals which are incessantly cropping their summits. The same is the case with those that grow along the shores, such as reeds, and aquatic trees, as willows, alders, poplars, osiers, mangroves, when the waters overflow, bury them in the sand, or uproot them, which very frequently happens. The shores would remain destitute of verdure, if the vegetables which grow there did not possess the faculty of reproduction by means of their own shoots. The case is different with the trees

of the mountains, as the palm, the fir, the cedar, the larch, the pine, which are not exposed to the same accidents and cannot be propagated by slips. If you only cut off the summit of a palm-tree, it dies.

We find the same laws of adaption in the generation of animals, to which we ascribe uncertainty as soon as we discover any variation, or which we approximate to the vegetable kingdom by imaginary relations when we perceive in them effects common to both. Thus, for example. if some of our insects are vivaparous in summer, it is because their young find at that season the temperature and food adapted to them, as soon as they come into the world: and if they are oviparous in autumn, it is because the offspring of these delicate insects could not survive the winter if they were not inclosed in eggs. For similar reasons, if you tear off the claw of a crab or a lobster, its place is supplied by another, which grows out of its body as a branch from a tree. Not this animals re-production is the effect of any mechanical analogy between the two kingdoms; but these animals being destined to live on the shores, among the rocks, where they are exposed to the agitation of the waves, Nature has given them the faculty of re-producing the limb liable to be injured or broken off by the rolling of rocky substances, as she has bestowed on vegetables which grow on the shores, the power of reproduction by shoots, because they are exposed to the danger of being overturned by the inundation of the waters.

Medicine has deduced a multitude of errors from the apparent analogies of the kingdoms of Nature. It is sufficient to examine the progress of its studies to be satisfied that they are extremely suspicious. It seeks the operation of the soul in the corpse, and the functions of life in the lethargy of death. If it perceives any valuable property in a vegetable, it extols it as an universal remedy. Listen to these aphorisms. Plants are useful to life; hence it concludes that a man may live on a vegetable diet for ages. It is impossible to enumerate the books, discourses

and eulogies which have been written on the virtues of plants. Multitudes of patients, nevertheless, die with their stomachs full of these wonderful simples. Not that I deny the efficacy of their qualities when judiciously applied, but I absolutely reject the reasonings which attempt to connect the duration of human life with the use of a vegetable diet. The life of man is the result of all the moral harmonies, and depends much more on sobriety, temperance and other virtues than on the nature of aliments. Do the animals which live entirely on plants attain only the age of man? The deer and chamois, which feed on the excellent herbs of Switzerland, ought never to die; yet their lives are but short. The flies which suck the nectar of their flowers likewise die, and several of their species in the space of one year. Every kind of animal has a term fixed for its life and a regimen peculiar to itself; man alone is permitted to use every variety of aliment. The Tartar lives on raw horse flesh, the Dutchman on fish, this nation on roots and that on a milk diet, and in all countries you meet with old people. Vice alone and mental uneasiness shorten human life: and I am pursuaded that the moral affections have such an extensive influence over man, that there is not a single disease but what owes its origin to them.

Hear what Socrates thought of the systematic philosophy of his age, for in all ages she has abandoned herself to the same extravagancies. "He did not amuse himself," says Xenophon, "with disquisitions on the secrets of Nature, nor with investigating, in what manner, that which the sophists call the world was created, nor what mighty power governs the celestial bodies. He exposed, on the contrary, the folly of those who addict themselves to such contemplations, and asked, if it was after having acquired a perfect knowledge of human things that they undertook to pry into those which are divine, or if they thought it an argument of their wisdom to neglect what was within their reach, in order to grasp at objects above them. H

was likewise astonished that they did not perceive the impossibility of man's comprehending all these wonders since those who had the reputation of possessing the mos intimate acquaintance with those subjects maintaine opinions diametrically opposite, and agree together no be ter than madmen. For as among madmen some are nc daunted at the prospect of the most terrible calamitie and others are affrighted where there is not hadow o danger, so, among philosophers, some have asserted tha there is no action which may not be performed in public nor any word which may not be spoken openly in the face of the whole world; others, on the contrary, have taught the necessity of shunning the society of men and withdrawing into perpetual solitude: some have despised the temples and the altars and decried the worship of the Gods; others have been so superstitious as to adore wood, stones and irrational animals. And as to the science natural things, some have acknowledged but one si being, others have admitted an infinite number: so have insisted that all things are in a state of perpetua motion, and others that there is no such thing as motion: some have asserted that the world is filled with incessant generations and corruptions, and others maintain that nothing is either generated or destroyed. He likewise said, that he wished to be informed by those people, whether they entertained the hope of being ever able to reduce to practice what they taught: as those who are acquainted with an art can exercise it when they please, either for their private emolument or for the benefit of their friends; and whether they likewise imagined, that, after having discovered the causes of every thing that exists, they should have it in their power to produce wind and rain, and dispose of times and seasons according to their necessities; or if they were contented with the mere knowledge of those things without any expectation or advantage rom them."

Not that Socrates was unacquainted with Nature; he

nd studied her thoroughly; but he had ceased to investigate causes that he might admire their results. No one d ever collected more observations on this subject than had done, and he frequently employed them in his versations on divine Providence.

Nature presents to us on every side nothing but harmos and adaptions to our necessities, and still we obstitely persist in vain efforts to discover the causes she ploys, as if we wish to rob her of the secret of her wer. We are not even acquainted with the most comon principles which she has placed in our hands and nder our feet. Earth, water, air and fire are elements, e say. But under what form must earth appear in order be an element? That stratum, called mould, *humus*, hich, almost every where covers it, and which serves as basis to the vegetable kingdom, is a compound of ds of substances, marl, sand, clay, vegetables. Is it the that constitutes its elementary part? Sand appears nothing more than fragments of rock. Is it the rock n, that is an element? But the rock appears in its rn to be an aggregation of sand, as we observe in the asses of free-stone. Which of the two, sand or rock was e principle of the other, and preceded it in the formation f the globe? When we have obtained information on is particular, what ground shall we have gained? There re rocks formed of all kinds of aggregations: granite is omposed of grains, marbles and calcareous stones of the aste of shells and madrepores. There are likewise banks f sand composed of the wreck of all these stones: I have een sand of crystal. Shell-fish which seem to throw some light on the nature of calcareous stone, by no means indicate the primitive origin of that substance, for they themselves form their shells of its particles floating in the sea. The difficulties increase, when we attempt to explain the formation of so many bodies, that issue from the earth and are nourished by it. In vain we call to our aid analogies, assimilations, combinations homogeneous and heteroge-

neous. Is it not strange, that so many thousands of species of vegetables, resinous, oily, elastic, soft and combustible, should differ entirely from the rugged and stony soil which produces them? The Siamese philosophers are under no embarrassment on this subject, for they admit, in Nature, a fifth element, which is wood. But this supplement is incapable of forwarding them much; for it is still more astonishing that animal matter should be formed of vegetable matter, than that this last should be formed of fossil. How can it acquire sense, life and passions? They have recourse, it is true to the intervention of the sun's action. But how can the sun be the cause of any moral affection, or if you like the phrase better, of any passion in animals, when we do not see him exercise a disposing influence on the component parts of plants? For example, his general effect is to dry up humidity. How then does it happen that, in a peach exposed to his action the pulp on the outside should be melting and the stone within should be hard; while the very reverse is the case with the fruit of the cocoa-tree, which internally is filled with milk and externally is clothed with a shell as hard as stone? Nor has the sun any more influence on the mechanical construction of animals; their interior parts which are most impregnated with humors, with blood and with marrow, are frequently the hardest, as the teeth and the bones; and the parts most exposed to the action of his heat are often extremely soft, as hair, feathers, the flesh and the eyes. Farther, how does it happen, that there is so little analogy between plants tender, ligneous, liable to putrefaction, and the earth which produces them; and between the corals and madrepores of stone which form banks so extensive between the tropics, and the sea-water in which they are formed? Apparently the reverse should have been the case; the water ought to have produced soft plants, and the earth solid plants. If things have been thus ordered, there is doubtless more than one reason for it: but I think I can discern a tolerably good one. It is this, that if these

analogies existed, the two elements would in a short time be uninhabitable; they would soon be overwhelmed by their own vegetation. The sea would be capable of breaking madrepores of wood, and the air of dissolving forests of stone.

The same doubts might be started concerning the nature of water. That element, we alledge, is composed of small globules which roll over one another: it is to the spherical form of its elements that its fluidity must be ascribed. But if it consists of globules, there must be between them intervals and vacuities, without which they would not be susceptible of motion. Why then is water incompressible? If you compress it strongly in a tube, it will force its way through the pores, if it be of gold, and will burst it, if of iron. Employ what efforts you please, you will not be able to reduce it to a smaller volume. But so far from being acquainted with the form of its component parts, we know not even that of the combined whole. Does it consist in being expanded into invisible vapors in the air like dew, or collected into fogs in the clouds, or consolidated into masses in ice, or finally in being fluid as in rivers? Fluidity, we say, is one of its principal characters. Yes, because we drink it in that state, and because, under this relation, it interests us the most. We determine this principal character, as we do that of all the objects of Nature, by the reason which I have already mentioned, that is, by our principal want; but this very character appears to be foreign to it, for it owes its fluidity only to the action of heat: deprive it of that and it is converted into ice. It would be very singular, if, notwithstanding our fundamental definitions, the natural state of water was to be solid, and the natural state of earth was to be fluid; and this must actually be the case if water owes its fluidity only to heat, and if earth is nothing more than an aggregation of sands combined with various kinds of glues, and attracted to one common centre by the general action of gravity.

The elementary qualities of the air are not more easy to be determined. Air, we say, is an elastic body; when it is inclosed in grains of gun-powder, the action of fire dilates it to such a degree, as to communicate to it the power of forcing an iron ball to a prodigious distance. But how, with all this elasticity, could it be compressed into grains of a crumbling powder? If you even put any liquid matter in fermentation into a flask, a thousand times more air will be disengaged from it than you could inclose in the vessel without breaking it. How could this air be confined in a substance soft and fluid, without setting itself at liberty by its own action? The air charged with vapors, we farther say, possesses a refractive power. The farther we advance to the north, the more elevated the sun appears over the horizon, above the place which he actually occupies in the heavens. The Dutch who wintered in 1597 in Nova Zembla, after a night of several months saw the sun appear again a fortnight earlier than they expected. All this is very well. But if vapors render the air refractive, why is there neither aurora, nor twilight, nor any durable refraction of light between the tropics, even on the sea itself, from which such quantities of vapors are exhaled by the action of the sun, that the horizon is sometimes enveloped by them in fog.

It is not vapors that refract light, says another philosopher, but cold, for the refraction of the atmosphere is not so great at the end of summer as at the end of winter, at the autumnal as at the vernal equinox.

I admit the accuracy of this observation; yet, after very hot days in summer, there is refraction in the north, as well as in our temperate climates, and there is none between the tropics: the cold, therefore, does not appear to me to be the mechanical cause of refraction, but it is the final cause of it. This wonderful multiplication of light, which increases in the atmosphere in proportion to the intenseness of the cold, is, in my opinion, a consequence of the same law, that causes the moon to pass into the northern

signs when the sun forsakes them, and to shine during the long nights of our pole, while the sun is below the horizon; for light, be it of whatever species it may, is warm. These wonderful harmonies are not in the nature of the elements, but in the will of him who has adapted them to the necessities of sensible beings.

Fire presents to us phenomena still more incomprehensible. In the first place, is fire matter? Matter, according to the definitions of philosophy, is that which may be divided into length, breadth, and depth. Fire can be divided only in perpendicular length. You will never be able to divide a flame, or a ray of the sun in its horizontal breadth. Here then is a matter divisible only in two dimensions. Farther, it has no gravity, for it continually ascends, nor levity, for it descends and penetrates bodies be they ever so low. Fire is contained, we are told, in all bodies; but, since it is of such a devouring nature, why does it not consume them? How can it remain in water without being extinguished? These difficulties, and several others, led Newton to believe that fire is not an element, but a certain subtile matter set in motion. Friction and collision, it is true, elicit fire from various bodies. But how happens it that air and water, though ever so much agitated, never catch fire? Why does water become cold with motion, though its fluidity is owing entirely to its being impregnated with fire? Wherefore, contrary to the nature of all other motions, does that of fire continue in a constant state of propagation, instead of being checked? All bodies lose their motion by communicating it. If you strike several balls with a single one, the motion is communicated among them, is divided, and lost; but a spark of fire disengages from a piece of wood particles of fire, or of subtile matter if you please, which are contained in it, and the whole together increase their rapidity to such a degree, as to involve a forest in one vast conflagration. We are not better acquainted with its negative qualities. Cold, we assert, is produced by the absence of heat; but if cold be only a

negative quality, why has it positive effects? If you put into water a bottle of frozen wine, as I have seen done oftener than once in Russia, you see in a short time, ice an inch thick cover the outside of the bottle. A block of ice cools the atmosphere which surrounds it, yet darkness, which is the negative of light, diffuses no obscurity over surrounding light. If you open on a summer's day, a grotto at the same time dark and cool, the surrounding light wil not be in the least affected by the darkness which it contained, but the warmth of the adjacent air will be considerably diminished by the cold air that issues from it. I am aware I may be told, that if there is no perceptible obscuration in the first case, it is owing to the extreme rapidity of the light which replaces the darkness; but this would be augmenting the difficulty, instead of resolving it, and would argue a supposition that darkness has likewise positive effects which we have not time to observe.

It is, however, on these pretended fundamental principles that we have reared most of the systems of our physics. If we are in error or in ignorance at the point from which we set out, we cannot fail very soon to go astray on the road; accordingly it is incredible with what facility, after having so slightly laid down our principles, we make amends for it, in the consequences, with vague expressions and contradictory ideas.

I have seen, for example, the formation of thunder explained in highly esteemed works on the subject of natural philosophy. Some demonstrate to you that it is produced by the collision of two clouds, as if it were possible for clouds or fogs to come into collision! Others tell you that it is the effect of the air, dilated by the sudden inflammation of the sulphur and nitre floating in the atmosphere. But, in order to be able to produce such dreadful explosions, we are under the necessity of supposing that the air was confined in a body, which made some resistance. If you set fire to a large mass of gunpowder exposed to the open air, no explosion takes place. I know well that the

explosion of thunder has been imitated in the experiment of fulminating powder; but the materials employed for that purpose have a kind of tenacity. They experience from the iron ladle which contains them a resistance against which they sometimes act with such violence as to perforate it. After all, to imitate a phenomenon is not to explain it. The causes assigned for the other effects of thunder are equally destitute of probability. As the air is found to be cooler after a thunder-storm, the nitre diffused through the atmosphere is, we are told, the cause of this; but was not the same nitre there before the explosion, when we were almost suffocated with heat? Does nitre diffuse coolness only when set on fire? At this rate our batteries of cannon ought to become glaciers in the midst of a field of battle, for a vast quantity of nitre is consumed by them; it is found necessary, however, to cool them with vinegar, for after twenty shots have been fired successively, it is impossible you can keep your hand applied to the piece. The flame of the nitre, though momentary, penetrates the metal notwithstanding its solidity. Their heat may it is true, likewise be occasioned by the interior convulsion of their parts. Be this as it may, the coolness of the air after a thunder-storm proceeds, in my opinion, from the stratum of icy air which surrounds us, at the elevation of between twelve and fifteen hundred fathoms, and which being divided and dilated at its base by the fire of the stormy clouds, is suddenly discharged into our atmosphere It is its motion that determines the lightning to take a direction contrary to its nature towards the earth. It likewise produces other effects, which neither time nor place permit me to unfold.

It was asserted in the last century, that the earth was elongated at its poles, and we now maintain that it is flattened there. I shall not, at present, enter into an examination of the principles whence this last conclusion has been deduced, and the observations by which it has been supported. The flattening of the earth at the poles has been

accounted for by a centrifugal force, to which its movement in the heavens has likewise been ascribed; though this pretended force, which has swelled out the diameter of the earth at the equator, has not the power of raising even a straw into the air. The flattening of the poles, they tell us, has been ascertained by the measurement of two degrees of the earth, made at a great expense, one in Peru, near the equator, and the other in Lapland, in the vicinity of the polar circle.* These experiments were undoubtedly made by men of distinguished knowledge and talents; but men of equal abilities and celebrity had proved upon other principles, and by other experiments, that the earth is elongated at the poles Cassini estimates at one hundred and fifty miles the length which the axis of the earth exceeds its diameters, which gives to each of its poles an elevation of seventy-five miles above the circumference of the globe. We shall certainly adopt the opinion of that illustrious astronomer, if we believe the evidence of our eyes; for the shadow of the earth appears to be oval at its poles in central eclipses of the moon, as was observed by Tycho Brahe, and Kepler. These names are in themselves a host.

But without referring, on the subject of natural truths, to the authority of any man, we may conclude, from simple analogies, the elongation of the axis of the earth. If, as I have already observed, we consider the two hemispheres as two mountains whose bases are at the equator, the summits at the poles, and the ocean which flows alternately from one of its summits, as a great river descending from a mountain; we shall have, under this point of view, objects of comparison which will assist us to determine the point of elevation from which the ocean sets out, by the distance of the place where it terminates its course. Thus the summit of Chimborasso, the most elevated of the Andes

* It is evident that we ought to conclude from those very measurements that the earth is elongated at the poles. See the explanation of the plate of the hemisphere, subjoined to Study IV. vol. i.

of Peru, from which issues the river of Amazons, havin an elevation of nearly four miles above the mouth of tha river, which is distant from it in a straight line about twenty-six degrees, of six hundred and fifty leagues, we may thence conclude that the summit of the pole must be elevated above the circumference of the earth nearly fifteen miles, in order to have a height proportioned to the course of the ocean, which extends to the equator, distant ninety degrees, or two thousand, two hundred and fifty leagues in a direct line.

If we farther consider that the current of the ocean does not terminate at the Line, but that, when it descends in summer from our pole, it proceeds beyond the Cape of Good Hope, to the eastern extremities of Asia, where it forms the current there denominated the western monsoon, which almost encompasses the globe under the equator, we shall be under the necessity of assigning to the pole whence it issues, an elevation proportioned to the space which it traverses, and of at least tripling the above elevation in order to give its waters a sufficient declivity. I therefore set it down at forty-five miles; and if to this height we add that of the ices which are there accumulated, the prodigious pyramids of which, reared on icy mountains, sometimes have one third of the elevation of the heights which support them, we shall find that the pole can scarcely have a less elevation than the seventy-five miles assigned to it by Cassini.

Obelisks of ice ten leagues high are not disproportioned to the centre of the cupolas of ice two thousand leagues in diameter, which in winter cover our northern hemisphere and which have likewise in the southern hemisphere, in the month of February, that is in the very midsummer of that hemisphere, borders as elevated as promonteries, and also a circumference of at least three thousand leagues, as was demonstrated by Captain Cook, who sailed round it in 1773 and in 1774.

The analogy which I establish between the two hemis-

pheres on the earth, the poles, and the ocean which flows from them, and two mountains, their peaks, and the rivers which there have their sources, is conformable to the harmonies of the globe, which presents a great number of similar harmonies in continents and in most of the islands, which are continents in miniature.

It would appear that philosophy has in every age affected to discover very obscure causes to explain the most common effects, with a view to attract the admiration of the vulgar, who, in fact, scarcely ever admire any thing but what they do not comprehend. She has not failed to avail herself of this weakness of mankind, and to envelope herself in pompous language or the mysteries of geometry, in order to impose upon them the better. How many ages has she not made our schools ring with the doctrine of the horror of a *vacuum* which she ascribed to Nature? How many sagacious demonstrations, as they were reputed, have been given, which were to crown with immortal glory authors now consigned to oblivion! She disdains, on the other hand, to dwell on simple observations, which place on the level of every capacity the harmonies that unite all the kingdoms of universal Nature. For example, the Philosophy of our day refuses to the moon any influence on vegetables and animals. It is, nevertheless, certain, that the growth of plants is most rapid in the night; that there are even several vegetables which flower only at that time; that numerous classes of insects, birds, fishes, and quadrupeds, regulate their loves, their chaces, and their peregrinations by the different phases of the luminary of night. But what, must philosophers condescend to avail themselves of the experience of gardeners and fishermen? Can it be supposed that they would deign to think and talk like men of such vulgar callings? If Philosophy denies the influence of the moon over the minute objects of the earth, she ascribes to her a very powerful action on the globe itself, without feeling any scruples concerning this self-contradiction. She affirms that the moon, in passing over the ocean, compresses it,

and thus occasions the tides on its shores. But how can the moon compress our atmosphere, which, as we are told, does not extend more than a score leagues from us? And even admitting that a subtle matter, and possessing great elasticity, should extend from the surface of our seas to the globe of the moon, how could this matter be compressed, unless we suppose it to be confined in a channel? Must it not, in the present state of things, extend to the right and to the left, and the action of the planet be incapable of operating on any given point of the circumference of our globe? Besides, why does not the moon act on the lakes and seas of small extent, where there are no tides? Their smallness can no more exempt them from the influence of her gravitation than of her light. Why are the tides almost imperceptible at the farthest extremity of the Mediterranean? Why are they subject in many places to intermittent movements and retardations of two or three days? Lastly, why, towards the north do they proceed from the north, from the east or from the west, and not from the south, as was observed, with astonishment, by Martens, Barentz, Linschotten, and Ellis, who expected to see them come from the equator, as on the coasts of Europe? The principal movements of the sea take place, it is true, in our hemisphere, at the same time with the principal phases of the moon; but we must not thence conclude their dependance, and still less explain it by laws which are not demonstrated. The currents and the tides of the ocean proceed, as I think I have proved, from the effusions of the ices of the poles, which depend, in their turn, on the variations in the course of the sun, as he approaches more or less toward either pole; and as the phases of the moon are themselves regulated by the course of that luminary, this is the reason why both take place at the same time. Farther, the moon, when full, has an effective and evaporating heat, as I have already observed. She must, therefore, act on the polar ices especially when at the full.*

* This observation was made more than sixteen hundred years ago: "The moon produces thaw; dissolving all ices and frosts by the humidity of her influence." *Pliny's Natural History, book* ii *chap.* 101.

The Academy of Sciences, in consequence of experiments made on the action of her rays with a burning glass upon the ball of a thermometer, maintained that her light gave no warmth; but this is not the first error into which we have been lead by our books and by our machines, as we shall perceive when we treat of the decomposition of the solar rays by means of a prism. Nor is it the first time that an assembly of men of science have, without examination, adopted an opinion on the authority of persons who make experiments with great formality and apparatus. This is the way in which errors obtained credit. That in question has however been refuted, first at Rome and afterwards at Paris, by a very simple experiment. Some one took a fancy to expose a vessel filled with water to the light of the moon, and to place another of the same kind in the shade. The water in the first was evaporated much sooner than that in the second.

In vain we exert all our ingenuity; we can seize nothing in Nature but results and harmonies; the first principles universally escape us. What is worse than all, the methods of our sciences have exercised a pernicious influence over our manners and our religion. It is very easy to mislead men with respect to an intelligence which governs all things, when nothing but mechanical means are presented to them as first causes. O! it is not by these that we can direct our course towards those heavens of which we pretend to have a knowledge. Thither the greatest of mankind have turned their eyes as to their last asylum. Cicero flattered himself that, after his death, he should be an inhabitant of the stars, and Cæsar fondly hoped from that elevation to superintend the destinies of Rome. An infinite number of other men have limited their future happiness to the expectation of presiding over a mausoleum, a grove, a fountain, and others to that of being reunited to the objects of their affections. As for us, what can we now hope from earth and heaven, where we see nothing but the levers of our paltry machines? What! as the reward of our virtues are we destined to be confounded with the ele-

ments? Shall thy soul, O my sublime Fenelon! be exhaled in inflammable air, that soul which had on earth a sentiment of an order that did not exist even in the heavens? Can it be possible that luminaries so brilliant should be nothing but material globes, and that their movements, so constant and so varied, should be merely blind attractions? What! can every thing around be insensible matter, and intelligence have been bestowed on man, who could give himself nothing, only to render him miserable? Can we have been deceived in the involuntary sentiment which causes us to raise our eyes towards heaven, in the agony of distress, to solicit relief? The animal on the point of finishing his career, abandons himself entirely to his natural instincts. The stag, when at the last gasp, seeks the most sequestred part of the forest, content to resign the untamed spirit which animates him, beneath their hospitable shades. The dying bee forsakes the flowers, returns to expire at the entrance of the hive, and to bequeath her social instinct to her beloved republic. And shall man, under the guidance of reason, find nothing in the universe worthy of receiving his departing sighs, neither inconstant friends, nor greedy relatives, nor an ungrateful country, nor a soil stubborn to all his labours, nor a heaven indifferent to guilt and to virtue?

Ah! it is not thus that Nature has distributed her gifts. We bewilder ourselves with our vain sciences. By carrying the researches of our understanding up to the very principles of Nature and of the Deity himself, we have stifled in our hearts the sentiment of both. The same thing has happened to us which once befel a peasant who led a happy life in a little valley in the Alps. A stream, descending from those mountains, fertilized his garden. For a long time he adored in peace the beneficent Naïad who supplied its current, and who increased its quantity and its coolness with the heats of summer. He one day took it into his head that he would go and discover the place where she concealed her inexhaustible urn. To insure

success, he began to trace upward the current of his brook He keeps ascending the mountain. Every step he takes discloses to him a thousand new objects, plains, forests, rivers, kingdoms, and vast oceans. Transported with delight, he flatters himself with the hope of soon arriving at the blest abode where the gods preside over the destiny of the world. But after a toilsome journey he arrives at the foot of a tremendous glacier He sees nothing around him but fogs, rocks, torrents and precipices. The sweet and tranquil valley, the humble cot, the beneficent Naïad, have all disappeared, his patrimony is nothing but a cloud and his divinity an enormous mass of ice.

In like manner, science has conducted us by seductive paths to a termination equally frightful. She draws down on her ambitious researches that ancient malediction, pronounced against the first man who should venture to eat of the fruit of her tree. "Behold the man is become as one of us to know good and evil." He shall not then "put forth his hand, and take also of the tree of life, and eat and live for ever." How many literary, political and religious quarrels have our pretended sciences excited? How many men have they not prevented from living only a single day!

The sublime genius and the pure spirit of Newton could not, undoubtedly, have stood still at the boundary of a vulgar mind. On observing the clouds repairing from all quarters to the mountains which divide Italy from Europe, he would have acknowledged the attraction of their summits, and the directions of their chains conformably to the basins of the seas and the courses of the wind; he would thence have inferred equivalent dispositions for the different summits of the continent and of the islands; he would have seen the vapours rising from the bosom of the American seas, and conveying fecundity through the air to the centre of Europe, fixing themselves in ice on the lofty pinnacles of the rocks, to cool the atmosphere of hot countries, undergoing new combinations to produce new effects,

and returning in a fluid state to their former shores, diffusing abundance in their way by a thousand and a thousand channels. He would have admired the constant impulsion given to so many different movements by the action of one single sun placed at the distance of ninety-six millions of miles; and instead of seeking the abode of a Naïad on the summit of the Alps, he would there have prostrated himself before that God whose Providence embraces the concerns of a whole universe.

To study Nature with understanding, all the parts must be combined into one grand whole. For my part, I, who am not a Newton, am determined not to quit the banks of my rivulet. I will remain in my humble valley, engaged in collecting herbs and flowers, happy if I am able to form with them some garlands to decorate the vestibule of the rustic temple which my feeble hands have presumed to rear to the majesty of Nature.*

* The system of the harmonies of Nature, which I am proceeding to unfold, is, in my opinion, the only one that is on a level with the understanding of mankind. It was first given to the world by Pythagoras of Samos, who was the father of philosophy and the founder of the sect of philosophers known by the name of Pythagoreans. Never did there exist men of science so enlightened as they in the natural sciences, or whose discoveries have reflected higher honor on the human understanding. There were, at that time, philosophers who maintained that water, fire, air, atoms, were the principles of things. Pythagoras asserted, on the contrary, that the principles of things were the adaptations and the proportions of which harmonies were composed, and that beneficence and intelligence constituted the nature of the Diety. He was the first that gave to the universe the epithet of κοσμος, *mundus*, on account of its order. He maintained that it was governed by a Providence; a sentiment perfectly conformable to the sacred writings and to experience. He invented the five zones and the obliquity of the zodiac. He declared that the torrid zone was habitable. He ascribed earthquakes to water. In fact, their focuses, as well as those of volcanoes, as we have already indicated, are always in the vicinity of the sea or of some great lake. He believed that each of the stars was a world, containing an earth, an air and a heaven, and even in his time this was a very ancient opinion, for it is to be found in the verses of Orpheus. Lastly, he discovered the square of the hypothenuse, which has given rise to an infinite multitude of geometrical theorems and solutions.

Philolaus of Crotona maintained, that the sun collected the fire diffused over the universe and reverberated it, which affords a better explanation of his nature than the perpetual emanations of heat and light which we ascribe to him without reparation and without exhaustion. He held that comets were stars which re-appeared after performing a certain revolution. Œcetes, another Pythagorean, insisted that there were two earths, that which we inhabit and another opposite to it, an idea applicable only to America.

These philosophers believed that the soul was a harmony composed of two parts, the one rational and the other irrational. They placed the first in the head and the latter about the heart. They asserted that it was immortal, and that at the death of the man his soul returns to the soul of the universe. They approved of divination by dreams and augury, but condemned that which is performed by sacrifices. Such was the humanity of their principles that they abstained from shedding the blood even of animals, and from eating their flesh. Nature rewarded their virtues and the gentleness of their manners by numberless discoveries, and gave them the glory of having as followers, Socrates, Plato, Architaf of Tarentum, who invented the screw, Xenophon, Epaminondas, who was educated by Lysis the Pythagoreans, the good king Numa, who taught the Tuscan priests to conjure down thunder, in a word, all the most illustrious characters that philosophy, literature, the military art and royalty can boast of.

Pythagoras has been calumniated as the author of various superstitious practices, among the rest, abstinence from beans, &c. But as truth is frequently obliged to appear to mankind under a veil, so the philosopher, under this allegory, conveyed to his disciples the advice to abstain from public employments, because it was then the custom to make use of beans in voting at the election of magistrates.

A very celebrated writer of modern times, who seems to have taken umbrage at every man of great reputation, has ventured to attack the character of Xenophon, in whom were combined almost all the qualities that dignify human nature, piety, purity of manners, military valor and eloquence. His style is so sweet that the Greeks bestowed on him the appellation of 'the Athenian Bee.' This great man has been censured on the ground of that celebrated retreat by which he brought back ten thousand Greeks into their country from the extremity of Persia, after a march of eleven hundred leagues, performed in spite of all the efforts of their enemies. A man of learning of the present day has asserted that the retreat of this great general was an effect of the good-nature or compassion of Artaxerxes; and he has, in consequence, treated the march of Xenophon by the north of Persia as an unnecessary precaution. But is it probable that the king of Persia should have shewn indulgence to the Greeks, when we know that by an act of the basest perfidy he cut off twenty-five of their chiefs? How could the Greeks have returned by the same road which they had gone, when every thing in that track was in motion to destroy them, and the Persians had laid waste all the villages? Xenophon defeated all their precautions by taking a course which they had not foreseen. For my part, I consider this as the greatest military exploit that was ever achieved, not only on account of the perpetual succession of battles and passages of mountains and rivers in the face of innumerable enemies, but because it was not stained by a single act of injustice, and had no other object than the preservation of citizens. The most celebrated warriors of antiquity have considered this retreat as a master-piece in the military art. We have on record an expression which will for ever cover it with glory: it was uttered in an age and among a people by which the science of war was carried to the highest perfection, and under circumstances which admitted not of dissimulation, I mean an expression of Antony when entangled in the country of the Parthians. This general, who possessed great military talents, and was at the head of an army of one hundred and thirteen thousand men, of whom sixty thousand were Roman citizens, being obliged, like Xenophon, to make a retreat in the face of the Parthians, and twenty times on the point of being cut off, frequently exclaimed with a sigh, "O the ten thousand!" (See Plutarch.)

STUDY X.

OF SOME GENERAL LAWS OF NATURE, AND FIRST OF PHYSICAL LAWS.

We shall divide these laws into laws physical and laws moral. We shall first examine some physical laws, common to all the kingdoms of Nature, and in the following Study, shall make the application of them to plants, conformably to the plan proposed at the commencement of the work. We shall then proceed to the consideration of moral laws, and shall endeavor to point out in them, as well as in the physical laws, the means of diminishing th sum of human wretchedness.

I have great reason to intreat the indulgence of my readers. I have undertaken to open a path hitherto unattempted, and I dare not flatter myself that I have made any very great progress in it. But the imperfect materials I have collected by the way, may, perhaps, one day, assist men of superior talents and in a more fortunate situation, in rearing to Nature a temple more worthy of her. Recollect, reader, that I promised you nothing more than the vestibule and the ruins of it.

OF CONCORDANCE.

Though concordance, coincidence, or conformity be a perception of our reason, I place it at the head of physical laws, because it is the first sentiment we endeavor to satisfy in examining the objects of Nature. Nay, there is such an intimate connection between the physical character of those objects, and the instinct of every being possessed of

sensibility, that a mere color is sufficient to rouze the passions of animals. A red object fires the bull with rage, and suggests to most fishes and birds the idea of prey. The objects of Nature unfold in the mind of man a feeling of a higher order, independent of his wants: it is that of concordance. It is by means of the multiplied concordances of Nature that man has formed his own reason; for reason signifies nothing more than the relation or the coincidence of the things that exist. Thus, for example, if I examine a quadruped, his eye-lids, which he can open or shut at pleasure, present coincidences with the light; the forms of his feet indicate a conformity to the soil which he inhabits. It is impossible to form any determinate idea of these, without combining on the subject various sentiments of concordance or discordance. Even objects the most material, and such as have not, strictly speaking, any decided form, cannot present themselves to us without these intellectual relations. A rustic grotto or a craggy rock, please or displease, according as they present ideas of repose or of obscurity, of perspective or of precipice.

Animals are sensible only to objects which have particular conformities to their wants. It may be asserted that they have, in this respect, a share of reason as perfect as ours. Had Newton been a bee, he could not, with all his geometry, have constructed his cell in a hive, without giving it, like that insect, six equal sides. But man differs from animals in extending this sentiment of conformity to all the relations of Nature, however foreign they may be to his necessities. It is this extension of reason that has procured him, by way of eminence, the denomination of a rational animal.

If, indeed, all the individual rationality of animals were united, it is probable that it would transcend the genera. reason of man, since he has devised most of his arts and crafts merely by imitating their operations; and besides, the animals bring with them into the world the perfect possession of their individual talents, whereas man can only

acquire his at the expence of much time and reflection, and, as I have just observed, by imitating the works of others. But man surpasses them not only by uniting in himself the intelligence diffused among them all, but by ascending to the source of all conformities, to the Deity himself. The only character which essentially distinguishes man from animals is this, that he is a religious being.

No animal shares with him that sublime faculty. It may be considered as the principle of human intelligence. It is by this that man has exalted himself above the instinct of the brute, so as to be enabled to form a conception of the general plans of Nature; and that he was led to the supposition of an order of things as soon as he had a glimpse of an author. By this he was emboldened to employ fire as the first of agents, to traverse the seas, to give a new face to the earth by agriculture, to subject all the animals to his dominion, to establish society on the basis of religion, and to attempt to raise himself to the Deity by his virtues. It was not Nature, as is generally supposed, that first pointed out the God to man, but it was a sense of the Deity in man that indicated to him the order of Nature. Savages are religious long before they are naturalists.

Accordingly, by the sentiment of this universal coincidence, man is struck with all possible conformities, though they may be foreign to him. The history of an insect is interesting to him; and if his attention is not engaged by the insects which surround him, it is because he perceives not their relations, unless some Reaumur be at hand to display them; or the habit of seeing them, renders them uninteresting, or perhaps it may be some odious or contemptible prejudice; for he is more affected by moral than by physical ideas, and by his passions than by his reason.

We shall farther remark, that all the sentiments of coincidence spring up in the heart of man, at the sight of some useful object, which frequently has no relation to his

wants. Hence it follows that man is naturally good, since the aspect alone of a conformity which is foreign to him, communicates a sense of pleasure. It is from this natural sentiment of goodness, that the sight of a well-proportioned animal conveys to us agreeable sensations, which increase as the animal unfolds to us his instinct. We love to see a turtle in an aviary, but that bird pleases us much more in the forests when murmuring forth her love on the summit of an elm, or when we perceive her engaged in building a nest for her young with all the solicitude of maternal tenderness.

It is likewise in consequence of this natural goodness, that discordance communicates a painful sensation, which is always excited by the aspect of any incongruity. Thus we are shocked at the sight of a monster It gives us pain to behold an animal that wants a leg or an eye. This feeling is independent of every idea of pain relatively to ourselves, notwithstanding the assertions of some philosophers; for we suffer, even though we know that it came into the world in that state. Withered plants, mutilated trees, an ill-assorted edifice hurt our feelings: and these feelings are perverted in man only by prejudice or by education.

OF ORDER

A SERIES of conformities which have one common centre constitute order. There are conformities in the members of an animal, but order exists only in the whole body. Conformity refers to the details, order to the combination. Order extends our pleasure, by collecting a great number of conformities, and it fixes them, by giving them a determination towards one centre. It discovers to us at once in a single object a series of individual conformities, and the principal conformity to which they all contribute. Thus order gives us pleasure, as beings endowed with reason which embraces all Nature, and it delights us sti

more perhaps, as feeble creatures capable of seizing only a single point at a time.

We behold with pleasure, for example, the relations of the sucker of the bee to the nectareous juices of flowers; those of her thighs hollowed into spoons and bristled with hairs to the powder of the stamina which she there collects; those of her four wings to the booty with which she is loaded, (a resource denied by Nature to flies which travel without burthen, and which, for that reason, have only two*); lastly, the use of the long sting which she has received for the defence of her property, and all the coincidences of the organs of this diminutive insect, which are more ingenious and more multiplied than those of larger animals. But the interest we already feel is increased, when we perceive her covered all over with a yellow powder, her thighs pendent and almost oppressed by her burthen, steering her flight through the air, crossing plains, rivers and forests, under points of the wind with which she is well acquainted, and alighting, with a humming noise, in the hollow trunk of some aged oak. Here we perceive a different order, on discovering a multitude of little individuals similar to herself, who are continually flying in and out engaged in the labors of the hive. That, whose particular conformities we are admiring is only a member of a numerous republic, and this republic is itself nothing more than a small colony of the immense nation of bees, scattered over the whole surface of the earth, from the Line to the shores of the Frozen Ocean. This nation is subdivided into different species, according to the various kinds of flowers; for there are some, which being destined to live on such as are radiated, are furnished with five hooks, to prevent their sliding on the petals. Others, on the contrary, as the bees of America, have no stings, because they construct their hives in the trunks of thorny

* The ichneumon, or aquatic dragon fly, has likewise four wings, because she likewise flies loaded with booty. I have seen her catch butterflies in the air.

trees, which are very common in that part of the world, and these are their protection. There are many conformities among the other species of bees with which we are totally unacquainted. Yet this great nation, whose colonies are so various, and whose possessions are so extensive, is but a very small family of the class of flies, of which we know, in our climate alone, nearly six thousand species, most of which are distinct from each other in form and instinct, as are the bees themselves from other flies. If we compare the relations of this volatile class, so numerous, with all the parts of the vegetable and animal kingdom, we shall find an innumerable multitude of different orders of conformity; and were we to add to them those that are presented by the legions of butterflies, scarabei, grasshoppers, and other insects which likewise have wings, we should multiply them to infinity. All this would be, however, but a little matter, if compared to the various industry of the other insects which crawl, leap, swim, climb, walk, remain motionless, whose number is incomparably greater than that of the first: and the history of these last, added to that of the others would still be the history of a petty race of this great republic of the world, replenished with innumerable shoals of fishes, and endless legions of quadrupeds, amphibious animals and birds. All their classes, with their divisions and subdivisions, are themselves only individual conformities, only rays and points in the general sphere, of which man alone occupies the centre and apprehends the immensity.

From the sense of general order result two other sentiments; the one which throws us imperceptibly into the bosom of the Deity, and the other which recals us to the feeling of our wants; the one which exhibits to us as the cause, a Being infinitely intelligent without us, and the other, as the end, a being extremely limited in our own persons. These two sentiments characterize the two powers, spiritual and corporeal, of which man is composed. This is not the place to unfold them: it is sufficient for me to re-

mark that these two natural sentiments are the general sources of the pleasure we receive from the order of Nature The animals are affected only by the second, and that in a very slight degree.

A bee possesses the sentiment of the order of her hive, but she knows nothing farther. She is totally ignorant of the order which directs the ants in their nest, though she may have often seen them engaged in their labors. In vain, if her hive were destroyed, would she seek refuge as a republican, in the midst of their republic. In vain, in her misfortune, would she display those qualities which she has in common with them, and which make communities flourish, temperance, industry, the love of country, and above all that of equality, united to superior talents; he would meet, from them, with neither hospitality, consideration, nor pity. She would not even find an asylum among other bees of a different species, for every species has its sphere assigned it, and this by an effect of the wisdom of Nature; otherwise the best organized, or the strongest species would expel the others from their domains. Hence it follows, that the society of animals cannot subsist without passions, nor human society without virtues. Man alone, of all animals, possesses the sentiment of universal order, which is that of the Deity himself, and by carrying over the whole earth the virtues which are the fruits of it, be the differences which prejudice interposes between men whatever they may, he is sure of drawing to himself every heart. It was by this sentiment of universal order which governed your lives, that you became citizens of every country, and that you still interest us even when ye are no more, Aristides, Socrates, Marcus Aurelius, divine Fenelon—and thou too, unfortunate Jean Jacques!

OF HARMONY.

NATURE opposes beings to each other, in order to produce conformities between them. This law was acknow-

ledged in the remotest antiquity. It is to be found in many passages of the sacred writings. Here is one from the book of Ecclesiasticus:* *Omnia duplicia, unum, contra unum et non fecit quidquam deesse*—"All things are double one against another, and he hath made nothing imperfect."

I consider this great truth as the key to all philosophy. It has been as fertile in discoveries as the following: "Nothing has been made in vain." It is the source of taste in the arts and in eloquence. From contraries arise all the pleasures of vision, of hearing, of the touch, the taste, and all the attractions of beauty, of whatever kind it may be. But, from contraries likewise arise ugliness, discord, and all the sensations which displease us. Is it not wonderful that Nature should employ the same causes to produce effects so different? When she opposes contraries to each other, painful sensations are excited in us, and when she blends them we are agreeably affected. From the opposition of contraries arises discord, from their combination results harmony.

Let us seek in Nature some proofs of this great law Cold is opposed to heat, light to darkness, earth to water, and the harmony of these contrary elements produces effects the most enchanting: but if cold succeeds rapidly to heat, most of the vegetables and animals exposed to these sudden revolutions are in danger of perishing. The light of the sun is agreeable; but if a black cloud suddenly intercept his rays, or if gleaming flames, such as those of lightning, burst from the bosom of that cloud, the eye, in either case, experiences a painful sensation. The horror of the storm is augmented, if the thunder adds its tremendous explosions, interrupted by intervals of profound silence; and it is still farther heightened if the opposition of these celestial fires and obscurities, of this tumult and tranquility, take place amid the gloom and the stillness of night.

Nature, in like manner, opposes, on the sea, the white

* Chap. xlii. v. 24.

foam of the billows to the black color of the rocks, to announce to the mariner from afar the danger of shallows. She frequently gives them forms, analogous to destruction, such as those of ferocious animals, of ruined edifices, or of vessels turned upside down. She even makes hollow sounds, resembling groans, to issue from them at distant intervals. The ancients imagined that in the rock Scylla they beheld a hideous female, whose waist was surrounded by a pack of dogs that barked incessantly. Our mariners have given to the rocks in the channel of the Bahamas, so noted for shipwrecks, the name of Martyrs, because they present, amid the spray of the billows which break upon them, the horrid spectacle of men impaled and exposed on wheels. You would even imagine that you heard sighs and groans issuing from these dismal rocks.

Nature likewise employs these clashing oppositions and these signs of death, to express the characters of cruel and dangerous animals of all kinds. The lion, roaming by night, amid the deserts of Africa, announces his approach from afar by roarings which perfectly resemble the rolling of thunder. The vivid and instantaneous flashes that dart from his eyes in the dark, exhibit likewise the appearance of the terrific meteor which accompanies it. In winter the howlings of the wolves in the forests of the north resemble the whistling of the winds that agitate the trees: the screams of birds of prey are shrill, piercing, and now and then interrupted by harsh sounds. Nay, there are some which emit sounds like those that proceed from a human being in pain. Such is the lom, a species of sea-fowl, which feeds among the rocks of Lapland, on the carcases of animals that perish there, and cries like a man who is drowning. Noxious insects present the same oppositions and the same signs of destruction. The gnat, thirsting after human blood, announces himself to the eye by the white spots with which his dark body is studded, and to the ear by shrill sounds which disturb the tranquility of the groves. The carnivorous wasp is striped like the

tiger with black bands on a yellow ground. We frequently find in our gardens, at the foot of trees that are decaying a kind of bug, which bears on its long red body, marbled with black, the mask of a death's head. Finally, the insects which attack our persons, however small they may be, are distinguished by the glaring oppositions of their colors to those of the ground on which they settle.

But when two contraries are blended, be they of whatever kind they may, pleasure, beauty and harmony are produced by the combination. I call the instant and the point of their union *harmonic expression*. It is the only principle that I have been able to discover in Nature; for her very elements are not simple, as we have already seen; they always present accords formed by two contraries, in analyses multiplied without end. Thus, to return to our examples, the most genial temperatures, and the most favorable in general, to every species of vegetation, are those of the seasons in which cold is blended with heat, as in the spring and autumn. They then occasion two kinds of sap in trees which the most intense heats of summer are capable of producing. The most agreeable effects of light and shade are perceptible at such times when they are blended with each other, and form what painters call *chiaro oscuro* and half-lights. Hence the most delightful hours of the day are those of the morning and of the evening, those hours when, as Lafontaine expresses it in his charming fable of Pyramus and Thisbe, "darkness and light struggle for the mastery in the azure fields." The most lovely prospects are those in which the land and the water are lost in each other, which suggested to honest Plutarch this observation, that the most pleasant journies are those that are made along the shore of the sea, and the most delightful voyages are such in which you coast along the land. You will observe these same harmonies resulting from the most opposite savors and sounds, in the pleasures of the palate and of the ear.

We shall proceed to examine the uniformity of this law

by the very principles, through which Nature communicates to us the first sensations of her works, which are colors, forms, and motions.

OF COLORS.

I SHALL be careful not to attempt a definition of colors, and still less an explanation of their origin. Colors, say our natural philosophers, are refractions of light on bodies, as is demonstrated by the prism, which, breaking a ray of the sun, decomposes it into seven colored rays, which display themselves in the following order; red, orange, yellow, green, blue, indigo, and violet. These, according to them, are the seven primitive colors. But, as I have already observed, I cannot pretend to say what is primitive in Nature. I might object to them, that if the colors of objects are produced only by the refraction of the light of the sun, they ought to disappear by the light of a taper, for the latter is not decomposed, or at least, in a very slight degree by the prism; but I shall confine myself to some reflections on the number and order of these seven pretended primitive colors. In the first place, it is evident that four of these are compounded; for orange is composed of yellow and red; green of yellow and blue; violet of blue and red; and indigo is nothing more than a tint of blue surcharged with black. This reduces the solar colors to three primordial colors, which are yellow, red and blue; if to these we add white, which is the color of light, and black which is the privation of it, we shall have five simple colors with which it is possible to compose every shade imaginable.

We must here observe, that our philosophical instruments deceive us with their air of superior intelligence, not only because they ascribe false elements to Nature, as when the prism gives compound for primitive colors, but by stripping her of true ones; for how many white and black bodies must be reputed colorless, since this same prism

does not exhibit their tints in the decomposition of the solar ray. This instrument leads us into another error relative to the natural order of these colors, in making the red ray the first and the violet ray the last. The order of colors in the prism is therefore nothing more than the triangular decomposition of a cylindrical ray of light, of which the two extremes, red and violet, partake of each other without terminating it; so that the principle of colors, which is the white ray, and its progressive decomposition are not exhibited by it. I am even very much disposed to believe, that a crystal may be cut with such a number of angles as to give the refractions of the solar ray an order totally different, and to multiply the pretended primitive colors far beyond the number of seven. The truth of such a polyedron would become quite as respectable as that of the prism, if algebraists were to apply to it a few calculations somewhat obscure, and some of the reasonings of the corpuscular philosophy, as they have done to the effects of the other.

We shall employ a method less learned to afford an idea of the generation of colors, and of the decomposition of the solar ray. Instead of examining them in a prism of glass, we shall consider them in the heavens, and shall there behold the five primordial colors unfolded in the order we have mentioned.

In a fine summer's night when the sky is serene, and the air is charged only with some light vapors, sufficient to break and refract the rays of the sun, as they traverse the extremities of our atmosphere, repair into the open plain where you can perceive the first fires of Aurora. You will first observe the horizon become white at the place where she is to make her appearance, and this kind of radiance, has, on account of its color, procured for it, in the French language the name of *aube* (dawn) from the Latin word *alba*, which signifies white. This whiteness insensibly ascends in the heavens, and assumes a yellow tint, a few degrees above the horizon; the yellow extends

a few degrees higher and then passes into orange; this shade of orange rises upwards into a deep vermilion which reaches to the zenith. From this point you will perceive in the heavens behind you the violet succeeding the vermilion, then the azure, afterwards the dark blue or indigo, and lastly an absolute black in the west.

Though this display of colors presents an infinite multitude of intermediate tints, which very rapidly succeed each other, yet there is a moment, and if my recollection be accurate, it is that when the sun is just ready to appear, in which the dazzling white is visible just at the horizon, the pure yellow as far as forty-five degrees, the color of fire up to the zenith; the pure blue forty-five degrees below it towards the west, and in the west itself the black veil of night still lingering on the horizon. At least, I think I have remarked this progression between the tropics, where there is scarcely any horizontal refraction, which causes the light to encroach prematurely on the darkness, as in our climates.

J. J. Rousseau one day observed to me, that though the ground of these colors of the heavens is blue, yet the tints of yellow that melt into it, never produce green, which results from the mixture of those two tints in our material colors. I replied, that I had frequently perceived green in the heavens, not only between the tropics, but likewise over the horizon of Paris. This color, indeed, is scarcely ever seen with us, but in some fine summer's evening. I have also beheld in the clouds of the tropics, all the colors perceptible on the earth, principally at sea and in stormy weather. Some are copper-colored, some the color o the smoke of a tobacco-pipe, others brown, red, black, grey, livid, chesnut, and the color of the mouth of a flaming oven. As to those which appear there in serene weather, some of them are so lively and so brilliant, that no palace could ever exhibit any thing equal to them, were even all the gems of the Great Mogul collected in it. Sometimes the trade-winds, from the north-east or south-east, which con-

stantly blow there, card the clouds like flocks of silk, and then sweep them away towards the west, crossing them over each other like the osier of a wicker-basket. Over the sides of this checquered work they throw the clouds they have not employed, and these are in no small number, roll them up into enormous masses as white as snow, turn their borders into the form of hills, and pile them one upon another like the Cordilleras of Peru, giving them the appearance of mountains, caverns and rocks; afterwards, as evening approaches, they become rather more calm, as if fearful of deranging their work. When the sun is setting behind this magnificent net-work, a multitude of luminous rays, dart through all the interstices, and produce such an effect, that the two sides of each lozenge, illuminated by them, appear to be edged with a fillet of gold, while the other two which are in the shade are tinged with a superb orange. Four or five streams of light, emanated by the setting sun up to the zenith, border with fringes of gold the indeterminate summits of this celestial barrier, and reflect their fires on the pyramids of the collateral aërial mountains, which then appear to be of silver and vermilion. At this moment you perceive, amid their endless ridges, a multitude of vallies extending to infinity, and distinguishing themselves at their openings by some shade of carnation or rose-color. These celestial vallies exhibit in their various contours inimitable tints of white, which melt away into white, or shades prolonged without mixing over other shades. You observe here and there torrents of light issuing from the cavernous sides of these mountains, and pouring their streams, like ingots of gold and silver, over rocks of coral. Here are gloomy, perforated rocks, through whose apertures you discover the pure azure of the firmament; there is an extensive strand covered with sands of gold, stretching over the rich ground of heaven, scarlet, poppy-colored and green as the emerald. The reverberation of these western colors is diffused over the sea, whose azure billows it tinges with saffron and

with purple. The mariners, leaning over the gun-wale of the ship, admire in silence these aërial landscapes. Sometimes this sublime spectacle presents itself at the hour of prayer, and seems to invite them to raise their hearts, as well as their voices to the heavens. It varies every instant; what a moment before was luminous is now simply colored, and what was colored is now in the shade. The forms are as variable as the tints; they are by turns islands, hamlets, hills planted with palm-trees, vast bridges stretching across rivers, fields of gold, of amethysts, of rubies; or rather, nothing of all this: they are celestial colors and forms, which no pencil can imitate, no language can describe.

It is very remarkable that all the travellers who have, at different seasons, ascended the most elevated mountains of the globe, between the tropics, and out of the tropics, in the heart of the continent or in islands, have never beheld in the clouds below them any thing but a grey, lead-colored surface, without any variation of color, and resembling that of a lake. The sun nevertheless, illumined those clouds with his whole light, and his rays might without obstruction have combined there all the laws of refraction to which our system of physics have subjected them. From this observation follows this result, which I shall repeat in another place on account of its importance, that not a single tint of color is employed in vain throughout the universe; that these celestial decorations were made for the level of the earth, and that their magnificent point of view is adapted to the habitation of man.

These admirable concerts of light and forms, which manifest themselves only in the lower region of the clouds, the least illumined by the sun, are produced by laws with which I am wholly unacquainted. But, let their variety be what it may, they are reducible to five colors; the yellow appears to be a generation from white, the red a deeper shade of yellow, the blue a tint of red strengthened, and the black the extreme shade of blue. It is impossible

to doubt of this progression, when you observe in the morning, as I have already mentioned, the expansion of light in the heavens; you there behold these five colors, with their intermediate tints, generated from each other nearly in the following order: white, sulphur yellow, lemon yellow, yolk of egg yellow, orange, the color of Aurora, poppy-color, full red, carmine red, purple, violet, azure, indigo, and black. Each of these colors seems to be only a strong tint, of that which precedes, and a faint tint of that which succeeds it; so that the whole together appears to be nothing more than a modulation of a progression, of which white is the first term and black the last.

In this order of which the two extremes, that is, light and darkness, produce, by harmonizing together, so many different colors, you will remark that the red color holds the middle place, and that it is the most beautiful of all, in the judgment of every nation. The Russians instead of saying that a girl is beautiful, say she is red. They call her *crastna devitsa;* red and beautiful being with them synonimous. In Peru and Mexico red was held in the highest estimation. The most magnificent present which the emperor Montezuma could devise for Cortes was a collar of shells which naturally had that rich color.* The only demand made by the king of Sumatre upon the Spaniards, who first landed in his country and presented him with many articles of the commerce and industry of Europe, was coral and scarlet-cloth,† and he promised to give them in return, all the spices and merchandize of India they could wish for. It is impossible to carry on an advantageous traffic with the Negroes, the Tartars, the Americans, and East Indians, unless by means of red stuffs. The testimonies of travellers respecting the preference universally given by all nations to this color, are unanimous. Of this I could produce innumerable proofs, were I not afraid of

* See Herrera.

† See General History of Voyages by the Abbé Prevost.

being tedious. I have merely indicated the universality of this preference to demonstrate the falsehood of the philosophical axiom, which asserts, that tastes are arbitrary, or what amounts to the same thing, that there are not in nature any laws for beauty, and that our tastes are the effect of our prejudices. The very reverse is the case: it is our prejudices that corrupt our natural tastes, which without them would be the same over the whole earth. It is from prejudice that the Turks prefer green to every other color, because, according to the tradition of their theologians, it was the favorite color of Mahomet, whose descendants alone, among all the Turks, enjoy the privilege of wearing green turbans. From a contrary prejudice their neighbours, the Persians, despise green, because they reject the traditions of the Turks, and deny that consanguinity of their prophet, being followers of Ali. From another kind of whim, yellow appears to the Chinese the most distinguished of all colors, because it is that of their emblematical dragon: yellow is, therefore, the imperial color in China as green is in Turkey: nevertheless, according to Isbrant Ides, the Chinese represent their Gods and heroes on the stage with their faces stained a blood color. All these nations consider red as the most beautiful color, the political color excepted; and this is sufficient to establish with respect to it an unanimity of preference.

But without dwelling longer on the variable testimony of men, that of Nature is quite sufficient. It is with red that Nature heightens the most brilliant parts of the most beautiful flowers. She has bestowed a complete clothing of it on the rose, the queen of flowers; she has given that tint to blood, the principal of life in animals; she invests most of the birds of India with a plumage of that hue, especially in the season of love. There are very few of the feathered tribe, on which she does not then bestow some shade of that rich color. Some have their heads covered with it, as the cardinals, others have breast-plates, collars, hoods, shoulder-knots of it. There are some which

preserve entirely the grey or brown ground of their plumage, but it is tipped with red, as if they had been rolled in carmine. Some of them are besprinkled with it, as if you had blown a scarlet powder over them. They have, besides, a mixture of small white spots, which produce a charming effect. A little bird of India, called *Bengali*, is painted in this manner.* But nothing is more lovely than a turtle-dove of Africa, which bears on her pearl-grey plumage, precisely over the place of the heart, a bloody spot, composed of several kinds of red and exactly resembling a wound. It appears as if this bird, dedicated to Love, was clothed in her master's livery and had served as a mark to his shafts. What is more wonderful, these rich coraline tints disappear in most of these birds, when the season of love is over, as if they were robes of ceremony, lent them by Nature only during the celebration of their nuptials.

Red, situated in the midst of the five primordial colors is the harmonic expression of them by excellence, and the result, as we have observed of the union of two contraries, light and darkness. There are other very agreeable tints composed by the opposition of extremes. For example with the second and fourth color, that is yellow and blue, is formed green, which constitutes a very beautiful harmony, and ought perhaps to hold the second rank in beauty among the colors, as it possesses the second in their genera-

* This beautiful bird is called by English naturalists the Lovely Finch, and from its figure and size has been classed among the sparrow kind. It is nearly of the same size as the mountain sparrow, being about five inches in length. Its wings are short scarcely reaching farther than the beginning of the tail, the feathers of which gradually decrease in length towards the edges, the colors of its plumage are striking and are disposed with great elegance. The forehead and throat are covered with a lively red, and this brilliant color appears to greater advantage by being contrasted with the ash grey that extends over all the rest of the head. The back and wing-coverts are of an olive-yellow; the feathers of the wings are black, and those of the tail are red, but less bright than the forehead and throat. On the upper part of the neck is a collar of a beautiful yellow; the feathers of the belly to the abdomen are white in the middle and black mixed with yellow on the edges: the abdomen and the lower tail-coverts are white; and the bill and feet are reddish. T.

tion. In the eyes of many persons, green even appears, if not the most beautiful, at least the most lovely of colors, being less dazzling than red and more congenial to the eye.*

I shall not enlarge on the other harmonic tints, that may be produced, conformably to the laws of their generation, from the most opposite colors, and of which might be formed accords and concerts, such as Father Castel produced with his celebrated harpsichord. I shall, however remark, that colors may have an influence on the passions, and that they, as well as their harmonies may be referred to the moral affections. If, for example, you begin with red, which is the harmonic color, supereminently,

* It is harmony that renders every thing perceptible, as it is monotony that makes every thing disappear. Not only colors are the harmonic consonances of light, but there is not any colored body, whose tint Nature does not heighten by the contrast of the two extreme generative colors which are white and black. Every body detaches itself by means of light and shade, the first of which inclines to white and the second to black. Each body, accordingly carries with it a complete harmony.

This is not the effect of chance. If we were enlightened, for example, by a luminous air we should not perceive the figure of bodies, for their contours, their profiles and their cavities would be covered with a uniform light, which would cause the prominent and retreating parts to disappear. It is therefore with a providence perfectly adapted to the weakness of our vision, that the Author of Nature has made the light to proceed from a single point of the heavens; and with an intelligence equally admirable, he has given a progressive motion to the sun, the source of that light, in order to form with the shades harmonies varying every instant. He has likewise modified this light on terrestrial objects, in such a manner as to enlighten both immediately and mediately; by refraction and by reflection; and to extend its tints and harmonies with those of shade, in a way which language cannot express.

J. J. Rousseau one day observed to me: "Painters can give the appearance of a body in relief to a smooth surface, I should like to see them give the appearance of a smooth surface to a body in relief." I made no reply at the moment, but having afterwards reflected on the solution of this optical problem, the thing appeared to me by no means impossible. Nothing more would be necessary, according to my idea, than to destroy the harmonic extremes which render bodies prominent. For example, to make a *bas relief* appear plain, its cavities should be painted white, or its prominent parts black. As artists employ the harmony of the chiaro oscuro to produce the appearance of a body on a level surface, in like manner they might make use of the monotony of a single tint to give the appearance of a level surface to those which are in relief. In the first case they exhibit to the view a body which cannot be felt; in the second they would produce one which might be felt and not seen. This last deception would be quite as surprizing as the other.

and proceed to white, the nearer you approach to this first term, the more lively and the more gay will be the colors. You will have in succession poppy, orange, yellow, lemon, sulphur, and white. On the contrary, the farther you proceed from red towards black, the more sad and dismal are the colors, for you will have purple, violet, blue, indigo and black. In the harmonies which you may form on both sides by the combination of opposite colors, the more of the tints of the ascending progression are employed, the more lively will be the harmonies, and the contrary will be the case when the colors of the descending progression predominate. From this harmonic effect it is that green, being composed of yellow and blue, is the more lively in proportion to the ascendency of the yellow, and the more sad in proportion to the prevalence of the blue. It is likewise from this harmonic influence that white diffuses most gaiety into all other colors, because it is light itself. It even produces, by opposition, a charming effect in the harmonies which I call melancholy; for, blended with violet, it gives the pleasing tints of the flower of lilac; mixed with blue it produces azure, and with black it forms a pearl-grey; but melted into red it exhibits that charming tint which colors the rose, the flower of life. If black, on the other hand, predominate among gay colors, the effect resulting from it is much more dismal, than that which it would produce unmixed. This may be seen when it is mixed with yellow, with orange, with red, which are then rendered dull and gloomy colors. Red imparts life to all the colors into whose composition it enters, as white communicates gaiety and black sadness.

If you would produce effects exactly contrary to most of those of which we have just been treating, you have only to place the extreme colors beside each other, without confounding them. Black, opposed to white, produces the most harsh and dismal effect. Their opposition is a sign of mourning among most nations, as it is also of destruction in the tempests of the heavens, and the com-

notions of the deep. Even yellow, opposed to black, is the characteristic of several dangerous animals, as the wasp and the tyger. None but women employ these opposite colors with advantage in their dress; but they embellish themselves only by the contrasts which they form between them and the color of their complexions; and as red predominates there, it follows that the opposite colors are advantageous to them, for harmonic expression is never stronger than when it is placed between the two extremes by which it is produced. We shall have some farther observations to offer concerning this part of harmony when we come to treat of the human figure.

We shall not pretend to deny that some objections may be started against the universality of these principles. We have represented white as a gay and black as a sad color; nevertheless, certain negro nations represent the devil white; the natives of the peninsula of India, in token of mourning, rub their forehead and temples with powder of sandal-wood, which is of a yellowish white color. The navigator La Barbinais, who in his voyage round the world has as ably described the manners of China, as those of our seamen and of several European colonies, says, that white is the color of mourning among the Chinese. From these instances it might be concluded, that the sense of colors is arbitrary, since it is not the same in all nations.

The reply we have to make on this head is as follows. We have already shewn in another place, that the people of Africa and Asia, however black they may themselves be prefer white women to those of every other color. If certain negro nations paint the devil white, this may possibly be occasioned by the strong sense they entertain of the tyranny which the whites exercise over them. Accordingly, white, having become with them a political color, ceases to be a natural one. Besides, the white with which they paint their devil, is not a white, replete with harmony, like that of the human figure, but a pure white, a chalk white, such as that with which our painters color the

figures of phantoms and spectres in their magical and infernal scenes. If this dazzling color is the expression of mourning among the Indians and Chinese, the reason is, it forms a harsh contrast with the dark skin of those nations. The Indians are black, and the complexion of the southern Chinese is much sun-burnt. They derive their religion and their principal customs from India, the cradle of the human race, the natives of which are black. Their exterior garments are of a dark color: robes of black satin are much worn among them; they wear black boots; the furniture of their houses is covered for the greatest part with the beautiful black varnish which we import from that country. White must, therefore produce a harsh dissonance with their furniture, their dress, and in particular with the dusky color of their skin. If these people wore in mourning, black habits, as we do, from the darkness of their color, it would not form a clashing contrast with their dress. The expression of grief is, therefore, exactly the same amoug them as among us; for if, in mourning, we oppose the black color of our dress to the white color of our skin, in order to create a funereal dissonance, the people of the south on the contrary, oppose the white color of their garments and the dusky hue of their complexion, for the purpose of producing the same effect.

This variety of taste admirably confirms the universality of the principles which we have laid down, respecting the causes of harmony and dissonance. It farther proves that the agreeableness or disagreeableness of a color resides not in one single tint, but in the harmony or contrast arising from two opposite colors.

We find demonstrations of these laws multiplied to infinity in Nature, to which man ought always to have recourse in his doubts. She forms harsh contrasts, in hot countries as in cold, of the colors of dangerous and destructive animals. Venemous reptiles are invariably painted with striking colors. Birds of prey universally have

earthy colors opposed to yellow and white spots on a dark ground, or dark spots on a light ground. Nature has given a fawn-colored robe, striped with brown, and sparkling eyes to the tiger, ambushed in the shade of the forests of the south; she has stained with black the snout and the claws, and with blood-color the throat and eyes of the white bear, and this renders him conspicuous, notwithstanding the whiteness of his skin, amid the snows of the north.

OF FORMS.

Let us now proceed to the generation of forms. It appears to me that their principles, like those of colors, may be reduced to five, namely, the line, the triangle, the circle, the ellipsis, and the parabola.

The line generates all forms, as the ray of light does all colors. Like the other it proceeds, in its generations by degrees, first producing by three fractions, the triangle, which, of all figures, contains the smallest of surfaces, under the greatest of circuits. The triangle, composed itself of three triangles at the centre, afterwards produces the square which has four, the pentagon which has five, the hexagon which has six, and the other polygons, up to the circle, composed of a multitude of triangles, whose summits are at its centre, and the bases at its circumference, and which, in opposition to the triangle, contain the greatest of surfaces, within the smallest of peripheries The form which has hitherto been progressively advancing, from one and the same centre, form a line to a circle, afterwards deviates from it, and produces the ellipsis, then the parabola, and lastly, all the other widened curves, all the equations of which may be referred to these last.

Under this aspect, then, the indefinite line has not any common centre; the triangle has three points in its circumference which have a common centre; the square has four, the pentagon five, the hexagon six, and the circle

has all the points of its circumference regulated to one common and only centre. The ellipsis begins to deviate from this arrangement, and has two centres, and the parabola, and the other curves analogous to it have an infinite number of centres comprehended in their axes, from which they remove farther and farther, forming as it were different species of funnels.

Having established this ascending generation of forms from the line, by the triangle, up to the circle, and their descending generation from the circle through the oval to the parabola, I deduce from these five elementary forms all the figures in Nature, as I compose all possible tints with the five primordial colors.

The line presents the slenderest form, the circle the fullest, and the parabola the most sloping. In this progression it may be remarked that the circle which occupies the middle place between the two extremes, is the most beautiful of all the elementary forms, as red is the most beautiful of all the primordial colors. I shall not say like certain ancient philosophers, that this form is the most beautiful because it is the figure of the stars, which, in fact would not be a contemptible reason, but if we only employ the evidence of our senses, it is the most grateful both to the eye and the touch; it is likewise the most susceptible of motions; finally, what is no mean authority with regard to natural truths, it is considered as the most pleasing by all nations who employ it in their ornaments and in their architecture, and is particularly conformable to the taste of children who prefer it in their instruments of diversion to every other.

It is remarkable that these five elementary forms have the same analogies to each other as the five primordial colors; so that if you proceed in their ascending generation from the sphere to the line, you will have forms angular, lively and gay; terminating in a right line, of which Nature composes numberless stellated and radiated figures, which are so agreeable in the heavens and on the earth.

If, on the contrary, you descend from the sphere to the excavated forms of the parabola, you will have cavernous figures which are so frightful in precipices and abysses.

Farther, if you join the elementary forms to the primordial colors, term for term, you will observe their principal character mutually strengthen each other, at least in the two extremes and in the harmonic expression of the centre; for the two first terms will give the white ray or line, which is the ray of light itself; the circular form, united to the red color, will produce a figure analogous to the rose, composed of spherical portions tinged with carmine, and in consequence of this two-fold harmony, deemed in the opinion of all nations the most beautiful of flowers. Lastly black added to the vacuity of the parabola, heightens the gloom of retreating and cavernous forms.

With these five elementary forms it is possible to compose figures as agreeable as the tints arising from the harmonies of the five primordial colors; so that the more of the two ascending terms of progression is blended in these mixed figures, the more light and gay will be such figures; and the more the two descending terms predominate, the more heavy and dull they will be. Thus the figure will be the more elegant, the more the first term, which is the straight line shall pervail in it.

For example, the column pleases us because it is a long cylinder, because it has a circle for its base, and two straight lines or a very long quadrilateral figure for its elevation. But the palm-tree, of which it is an imitation pleases still more, because the stellated or radiated forms of its palms, likewise taken from a straight line, constitute a very agreeable opposition to the roundness of its stem; and if to this you add the harmonic form, by excellence, that is the circular form, you will add inexpressibly to the gracefulness of that beautiful tree. This likewise has been done by Nature, who knows much more of the matter than we, for she has suspended at the base of its divergent branches sometimes the oval date, and sometimes the circular cocoa nut.

In general, whenever you employ the circular form, you will greatly enhance the pleasure it affords by uniting with it the two contraries that compose it; for you will then have a complete elementary progression. The circular form alone presents but one expression, though, in truth, the most beautiful of all: but when united to its two extremes, it forms, if I may so express myself, a complete idea. It is from the effect which thence results that the vulgar consider the form of the heart to be so beautiful, that they compare to it every other beautiful object. "'Tis beautiful as a heart," say they.* This form of a heart consists at its base of a projecting angle, and above of a retreating angle, there we have the extremes; and in its collateral parts of two spherical portions; there is harmonic expression.

It is farther from the same harmonies that the long ridges of mountains, crowned with lofty pyramidal peaks and separated from each other by deep vallies, delight us by their gracefulness and their majesty. If to these you add rivers winding below, radiating poplars on their banks, flocks and shepherds, you will have vallies resembling those of Tempe. In this landscape, the circular forms of mountains are placed between their extremes, which are the projecting parts of the rocks and the retreating parts of the vallies. But if you separate from it the harmonic expressions, that is, the curvatures of these mountains, together with their happy inhabitants, and suffer their extremes only to remain, you will then have a dreary portion of the land of Cape Horn, angular and peaked rocks on the brink of precipices.

If to these you add oppositions of color, as that of snow on the summits of their dusky crags, the foam of the billows breaking on the blackened shore, a lurid sun in a

* This idea, which many a reader will undoubtedly consider as rather whimsical, if not absurd, must certainly be confined to the commonalty of the native country of the author, or perhaps of some particular district of it. T.

gloomy sky, torrents of rain in the midst of summer, tremendous squalls succeeded by calms no less frightful, a European vessel on her way to spread desolation over the South seas, striking upon a rock just at the close of day, firing from time to time guns, the signals of distress, whose report is repeated by the echoes of these horrid deserts, frighted Patagonians hastening to their caves, you will have a complete view of that land of desolation, covered with the shades of death.

OF MOVEMENTS.

It remains for me to make a few observations concerning movements. Of these we shall likewise distinguish five principal ones; motion, properly so called, or the rotation of a body round itself, which supposes no change of place, and which is the principle of all motion; such is perhaps that of the sun; next the perpendicular, the circular, the horizontal and the state of rest. To these all movements may be referred. You will even remark that geometricians, who likewise represent them by figures, suppose the circular motion to be generated by the perpendicular and the horizontal, and, to make use of their language, produced by the diagonal of their squares.

I shall not insist on the analogies of the generation of colors and of forms to those of the generation of motions, and which subsist between the white color, the straight line, and motion proper or rotation; between the red color, the spherical form, and the circular motion; between darkness, vacuity and rest. I shall not pretend to unfold the infinite combinations which may result from the union or the opposition of the corresponding terms of each generation, and of the relations of these same terms. I leave to the reader the pleasure of prosecuting this idea, and of forming with these elements of Nature harmonies enchanting and perfectly new. I shall confine myself, in this place, to a few rapid observations on motions.

Of all motions the harmonic or circular motion is most agreeable. Nature has diffused it over most of her works, and has even rendered vegetables fastened down to the ground susceptible of it. Our plains present us with frequent images of it, when the winds form on the meadows long undulations resembling the waves of the sea, or gently agitate on the summits of the mountains, the towering tops of the trees, and make them describe portions of a circle. Most birds form large circles as they sport in the aërial expanse and delight in tracing in it a multitude of curves and spiral figures. It is remarkable that Nature has bestowed this agreeable kind of flight, on various innocent species of the feathered tribes, which otherwise possess no recommendation in point of song or plumage. Such among others is the flight of the swallow.

The case is very different with respect to the progressive motion of ferocious or noxious animals: they advance by leaps and bounds, and to movements at times extremely slow, they join others that are violently rapid: this may be observed in the motions of a cat when she catches a mouse. Those of the tiger when he endeavours to seize his prey are exactly similar. The same discordances are observable in the flight of carnivorous birds. That species of owl called the great horned owl, flies in the midst of a tranquil sky, as if driven to and fro by the wind. Tempests present, in the heavens, the same characters of destruction. Sometimes you behold the clouds moving in opposite directions; at others you perceive them flying with the rapidity of a courier, while others remain motionless as rocks. In the hurricanes of India, the tremendous gusts of wind are always intermingled with profound calms.

The more a body possesses of motion proper or rotation, the more agreeable it appears, especially when to this movement is united the harmonic or circular motion. For this reason the trees whose leaves are moveable, as the aspin and the poplar, are much more graceful than the other trees of the forest when agitated by the wind. They

please the eye by the waving of their tops and by presenting alternately the two sides of their leaves of two different tints of green. They likewise delight the ear by imitating the bubbling of water. It is from the effect of motion proper, that, setting aside every moral idea, animals interest us more than vegetables, because they have within themselves the principles of motion.

I believe there is not a single spot on the face of the earth in which some body is not in motion. Often have I been in the midst of vast solitudes, by day and by night, in seasons of the profoundest tranquillity, and I always heard a noise of some kind. Frequently, indeed, it was only that of a bird flying, or of an insect stirring a leaf; but still that sound supposes motion.

Motion is the expression of life: for this reason Nature has multiplied the causes of it in all her works. One of the great charms of a landscape is to see motion in it, and this the pictures of most of our great masters fail to express. If you except such as represent tempests, you will invariably find their forests and the meadows motionless, and the waters of their lakes frozen. Nevertheless the inversions of the leaves of trees, turning up a grey or a white underside, the undulations of the grass in the vallies and on the brows of the mountains, those that ruffle the polished surface of the waters, and the foam that whitens the shores, remind the spectator with inexpressible pleasure in a burning summer scence, of the refreshing breath of the zephyrs. To these might be added, with infinite grace, the movements peculiar to the animals which inhabit them; for example the concentric circles formed by the diver on the surface of the water, the flight of a sea-fowl taking its departure from a hillock, its legs stretched out behind and its neck before; that of two white doves, skimming side by side, in the shade, along the skirts of a forest; the rocking of a wag-tail at the end of the leaf of a reed bending beneath her weight. It would even be possible to express the motion of a loaded carriage slowly ascending

a hill, by representing the dust of the crushed pebbles rising around its wheels. Nay I even imagine, that it would be possible to render the effects of the singing of birds and of echoes perceptible, by the expression of certain harmonies of which it is not necessary to treat in this place.

So far are most of our painters, even among those of the most distinguished talents, from employing accessaries so agreeable, that they omit them even in subjects of which these accessaries form the principal character. If, for example, they represent a chariot in motion they never fail to exhibit every spoke of the wheels. The horses, indeed, are gallopping; but the chariot is motionless. Each of the wheels, however, of a carriage that is running with a rapid motion, appears like one solid surface; all its spokes are blended together to the eye. It was not thus that the ancients, our masters in every branch of the arts, imitated Nature. Pliny informs us that Apelles had so accurately painted chariots with four horses, that the wheels appeared to turn round. In the curious list which he has transmitted to us of the most celebrated paintings of antiquity, which were the admiration of Rome even at his time, he mentions one representing a woman spinning wool, whose spindle seemed actually to whirl, and another held in high estimation, "in which were seen two light-armed soldiers, one of whom is so heated with running during the battle, that you see him sweat, and the other, who is laying down his arms, appears so fatigued, that you imagine you hear him panting." In many modern pictures I have seen machines in motion, wrestlers and warriors in action, but never observed effects so simple and so expressive of truth. Our painters consider them as petty details beneath the notice of a man of genius. Nevertheless these petty details are traits of character.

Marcus Aurelius, who possessed quite as much genius as any of our moderns, has very judiciously remarked that these are the things on which the mind frequently fixes

its attention, and which afford it the greatest pleasure "The sight of the shrivelling of ripe figs," says he, "the bushy eye-brows of the lion, the foaming of an enraged wild boar, the reddish scales which rise on the crust of a loaf just taken from the oven, fills us with delight." There are several reasons for this pleasure, occasioned in the first place by the weakness of the human mind, which in every object fixes on some principal point, and in the next by Nature, who, in all her works, likewise presents to us one single point of conformity or discordance, which is, as it were, its centre. Our mind increases its affection or its aversion, in proportion as this characteristic trait is simple, or in appearance contemptible. For this reason, in eloquence the shortest expressions always convey the strongest passions; for, as we have hitherto seen, all that is requisite to produce a sensation of pleasure or of pain, is, to determine a point of discord or of harmony between two contraries: now when these two contraries are opposite in nature, and likewise in magnitude and in weakness their contrast is redoubled and so is consequently their effect.

To this conspires in a particular manner, the surprize of seeing great subjects of hope or of fear arising from objects apparently of little importance; for every physical effect produces in man a moral sentiment. I have seen, for example, many pictures and descriptions of battles which endeavoured to inspire horror by the infinite variety of weapons of every kind represented in them, and by a multitude of dead and dying, wounded in every possible way. The greater was the quantity of machinery employed to move me, the less was I moved; one effect destroyed the other. But I was much more affected on reading in Plutarch the death of Cleopatra. This great painter of adversity represents the queen of Egypt meditating in the tomb of Anthony on the means of eluding the triumph of Augustus. A peasant, with the permission of the guards on duty at the entrance of the tomb, brings her a basket

of figs. The moment he has retired, she hastens to uncover the basket, and perceives the asp which she had sent for, in order to put a period to her miserable life. This contrast, in a woman, of liberty and of slavery, of royal power and of annihilation, of voluptuousness and of death; those leaves and fruits, among which she perceives only the head and the sparkling eyes of the puny reptile prepared to terminate interests so important, and to which she says: "There you are!"—all these oppositions make you shudder. But in order to render the very person of Cleopatra interesting, it is not requisite that you should picture her to yourself as she is represented by our painters and sculptors, an academic figure destitute of expression, a Sabina in stature, robust and replete with health, with large eyes turned towards heaven, and wearing round her brawny arm a serpent twisted like a bracelet. This is no representation of the little and voluptuous queen of Egypt, who had herself carried, as we have elsewhere observed, in a bundle of clothes, on the shoulders of Apollodorus, to keep a secret assignation with Julius Cæsar; running at night disguised as a shopkeeper, through the streets of Alexandria with Anthony, rallying him and tauntingly declaring that his jests and his humor smell strongly of the soldier. Still less is it that unfortunate Cleopatra, reduced to extreme wretchedness, drawing up, by means of cords and chains, with the assistance of two of her women, through the window of the monument in which she had taken refuge, her head downward and never letting go her hold, says Plutarch, the same Anthony, covered with blood, who had run himself through with his sword, and who mustered all his remaining strength that he might get up and expire in her arms.

Details are not to be despised; they are frequently traits of character. To return to our painters and sculptors, if they refuse expression of motion to landscapes, to wrestlers, and to chariots in the course, they however bestow it on the portraits and statues of our great men and philoso-

pters. They represent them as angels sounding the trump of the last judgment, with hair flying about, wild, wandering eyes, the muscles of the face in a state of convulsion, and their garments fluttering in the wind. These, they say, are the expressions of genius. But men of genius, and distinguished characters are not madmen. I have seen portraits of some on antiques. The medals of Virgil, of Plato, of Scipio, of Epaminondas, nay even of Alexander, represent them with an air of calmness and serenity. Let inanimate bodies, vegetable and animal, obey all the movements of Nature; a great man, in my opinion, ought to be the master of his own emotions, and it is only from the possession of this empire that he deserves the title of Great.

I have deviated a little from my subject, to give a few lessons of conformity to artists, whose art is much more difficult of execution than it is easy for me to criticise God forbid that any thing that I have said should give moment's pain to men whose works have so often afforded me delight! I only wish them to avoid the academic manner by which they are fettered, and to stimulate them to follow the track of Nature as far as their genius will carry them.

This would be the proper place to speak of music, for sounds are nothing but movements, but persons of abilities far superior to mine have thoroughly investigated that great art. If any foreign testimony could confirm me in the certainty of the principles I have hitherto laid down it is that of the most skilful musicians who have reduced harmonic expression to three sounds. Like them I might have reduced to three terms the elementary generations of colors, of forms, and of movements but, in my opinion, they have themselves omitted in their fundamental basis, the generative principle, or sound, properly so called, and the negative term or silence, especially since the latter produces such powerful effects in the movements of music.

I might extend these proportions to tastes, and demonstrate that the most agreeable among them have similar generations; as we find by experience in most fruits, whose different degrees of maturity present successively five tastes, the acid, the sweet, the saccharine, the vinous and the bitter. They are acid while growing, sweet when ripe, saccharine in a state of perfect maturity, vinous in their fermentation, and bitter in a state of dryness. We should farther find that the most agreeable of these tastes, namely, the saccharine, occupies the middle of this progression, of which it is the harmonic term; that it forms by its nature, new harmonies, when combined with its extremes; for the beverages which are most grateful to the palate are those composed of acid and sugar, as the refreshing liquors prepared with lemon juice; or of sugar and bitter substances, as coffee: but while I am endeavouring to open new paths to philosophy, it is not my intention to present new combinations to voluptuousness.

Though I am thoroughly convinced of the truth of these elementary generations, and am able to support them with a multitude of proofs which I have collected relative to the tastes of nations both polished and savage, but which time permits me not to introduce in this place; yet I should not be surprized if many of my readers were to differ from me in opinion. Our natural tastes are perverted, from early infancy, by the prejudices which influence our physical sensations much more powerfully than these last direct our moral affections. More than one ecclesiastic considers purple as the most beautiful of colors because his bishop wears it; more bishops than one give the same preference to scarlet because it is the cardinal's color; and more than one cardinal undoubtedly, would rather be dressed in white, because that is the color of the head of the church. A soldier frequently looks upon the red as the most beautiful of ribbons, and his superior officer prefers the blue. Our constitutions, as well as our conditions, have an influence on our opinions. Persons of

gay dispositions prefer lively colors to all others, persons of delicate feelings like softer hues, and the melancholy are pleased with dusky tints. Though I myself consider red as the most beautiful of colors, and the sphere as the most perfect of forms, and though I am bound more strongly than any other to adhere to this order, because it is the order of my system, I yet prefer to red the carmine which has a tint of violet, and to the sphere the oval or the elliptical form. It likewise appears to me, if I may venture to say so, that Nature has adapted both these modifications to the rose, at least before its complete expansion. I farther like violet-colored flowers better than white, and much better than yellow. I prefer a branch of lilac to a pot of stock-gillyflowers, and a China daisy with its disk of a smoky yellow and its violet and dusky petals, to the most flashy clustre of sun-flowers in the gardens of the Luxembourg. I am persuaded that I have these tastes in common with many other persons, and that, to form a judgment of the characters of men, by the color of their dress, there are many more of a serious than of a gay disposition. I am likewise of opinion, that Nature (for to her we must always have recourse to ascertain the truth) has given most of her physical beauties a tendency towards melancholy. The plaintive notes of the nightingale, the shades of the forests, the sombre lustre of the moon, inspire no gaiety, but yet they are interesting. I feel much greater emotion in contemplating the setting than the rising sun. In general we are pleased with lively and sprightly beauties, but we are affected only by such as are melancholy. We shall endeavour in another place to unfold the causes of these moral affections. They are connected with laws more sublime than physical laws: while these amuse the senses, those address the heart and apprize us that man is born for a higher destination.

I may possibly be mistaken in the order of these generations and may have transposed the terms. The only object I have in view is to open new paths in the Study of Nature.

it is sufficient for my purpose if the effect of these generations be generally acknowledged. Men more enlightened may arrange their relations in better order. All that I have said on this subject, or may still have to say, is reducible to this great law: every thing in Nature is formed of contraries; from their harmonies spring the sense of pleasure, from their opposition results the sense of pain.

This law, as we shall see, extends also to morals. Every truth, excepting truths of fact, is the result of two contrary ideas. Hence it follows, that whenever we decompose a truth by logic, we divide it into the two ideas of which it is constituted; and if we assume one of its elementary ideas as the only principle, and deduce consequences from it, we create a source of endless dispute; for the other elementary idea will furnish results diametrically opposite, to the person who is disposed to pursue them; and these results are themselves susceptible of contradictory decompositions which go on without end. This the schools are admirably adapted to teach us, and thither we are sent to form our judgment. They instruct us to separate the most evident truths, not only into two, but, as Hudibras says, into four. If, for example, some one of our logicians considering the influence of cold on vegetation, should endeavour to prove that cold is the only cause of it, and that heat is even prejudicial to it, he would not omit to mention the efflorescences and the vegetation of ice, the growth, the verdure, and the flowering of mosses during winter, the plants burnt up by the sun in summer, and many other effects relative to his thesis. But his antagonist, availing himself, on his side, of the influences of spring, and the devastation of winter, would not fail to demonstrate, that heat alone imparts life to vegetables. Nevertheless, the truth is, that heat and cold together form one of the principles of vegetation, not only in temperate climates, but even in the midst of the torrid zone.

It may be affirmed that all disorders, whether physical or moral, are nothing more than oppositions produced by

the collision of two contraries. If men would pay attention to this law, it would put an end to most of their errors and disputes; for it may be said, that as every thing is composed of contraries, whoever affirms a simple proposition is only half right, since the contrary proposition has equally an existence in Nature.

There is perhaps, in the world, but one truth intellectual, pure, simple, and without any contrary idea; it is the existence of God. It is very remarkable, that those who have denied it adduce no other proofs to support their negation, than the apparent disorders of Nature, the extreme principles of which alone they took into consideration; so that they have not proved the non-existence of God, but that he is not intelligent, or that he is not good. Their error, therefore, proceeds from their ignorance of the laws of Nature. Besides, their arguments have been founded, for the most part on the disorders of men, who exist in a different order from that of Nature, and who are the only beings endowed with sense who have been abandoned to to their own direction.

With regard to the nature of God, I know that religion herself represents him as the harmonic principle, by way of excellence, not only with relation to all that surrounds him, of which he is the creator and the mover, but even in his essence divided into three persons. Bossuet has extended these harmonies of the Deity to man, by seeking to discover in the operations of his soul some conformity to the Trinity of which it is the image. These lofty speculations are, I must acknowledge, infinitely above my capacity. Nay, I am filled with wonder, that the Deity should have permitted beings so weak and so transitory, to have so much as a glimpse of his omnipotence on earth, and that he should have veiled, under the combinations of matter, the operations of his infinite intelligence, in order to adapt it to our perception. A single act of his will was sufficient to give us existence; the slightest communication of his works to illumine our reason; but I am persuaded,

that if the smallest ray of his divine essence were to be directly communicated to us in a human body, we should be annihilated.

OF CONSONANCES.

Consonances are repetitions of the same harmonies. They augment our pleasures by multiplying them, and transferring the enjoyment of them to new scenes.

They farther delight us, by demonstrating that the same intelligence presided over the different plans of Nature, since it every where presents us with similar harmonies. Accordingly, consonances confer more pleasure than simple harmonies, since they inspire sentiments of extension and of the Divinity, so congenial to the nature of the human soul. Physical objects excite in us a certain degree of pleasure, only by unfolding an intellectual feeling.

We find frequent examples of consonances in Nature. The clouds of the horizon, often resemble, at sea, the forms of mountains and the appearances of land, with such accuracy, as sometimes to deceive the most experienced mariner. The waters reflect in their changeable bosom the heavens, the hills, the forests. The echoes of the rocks repeat in their turn the murmur of the waters. Walking one day, along the sea-side in the Pays de Caux, and observing the reflections of the shore in the bosom of the waves, I was not a little surprised to hear other billows roaring behind me. I turned round, and perceived only a high, steep shore, whose echoes repeated the noise of the waves. This double consonance appeared extremely delightful; you would have said there was a mountain in the sea, and a sea in the mountain.

These transpositions of harmony from one element to another communicate great pleasure. Accordingly, Nature frequently multiplies them, not only by fugitive images, but by permanent forms. In the midst of the ocean, she has repeated the forms of continents in those of islands,

most of which, as we have already seen, have peaks, mountains, lakes, rivers, and plains, proportioned to their extent, as if they were worlds in miniature. On the other hand, she represents, in the midst of the land, the basons of the vast ocean in the mediterraneans, and in the great lakes, which have their shores, their rocks, their islands, their volcanoes, their currents, and sometimes a flux and reflux, which is peculiar to themselves, and is occasioned by the effusions from icy mountains, at whose feet they are commonly situated, as the currents and the tides of the ocean are produced by those of the poles.

It is very remarkable that the most beautiful harmonies are those which have the most consonances. Nothing in the world, for example, is more beautiful than the sun, and nothing is more frequently repeated in Nature than his form and his light. It is reflected in a thousand different ways by the refractions of the air, which every day exhibit him above all the horizons of the globe, before he has risen and after he is set; by parhelia which sometimes exhibit two or three reflections of his disk at once, in the hazy skies of the north; by rainy clouds, in which his refracted rays trace an arch tinged with a thousand hues; and by the waters, whose refluxes represent him in an infinite number of places where he is not, in the bosom of meadows, amid flowers besprinkled with dew, and in the shade of verdant forests. The earth, dull and unpolished, reflects him too, in the specular particles of sand, of mica, of crystals, of rocks. It exhibits the form of his disk and of his rays in the disks and in the petals of a multitude of radiated flowers with which it is covered. Finally, this brilliant luminary is himself multiplied to infinity, with variations unknown to us, in the innumerable stars of the firmament, which he discovers to us as soon as he quits the horizon, as if he withdrew his presence from the consonances of the earth, merely to display to the eye those of the heavens.

From the law of consonances it results, that whatever is

best and most beautiful in Nature is the most common and the most frequently repeated. To this must be ascribed the various species in each genus, which are so much the more numerous, in proportion to the utility of that genus. In the vegetable kingdom, for example, there is no family so necessary as that of gramineous plants, which afford subsistence not only to all the quadrupeds, but to an infinite number of birds and insects; nor is there any whose species are so varied. We shall notice, in the Study on Plants, the reasons of this variety. I shall only remark in this place, that it is among the gramineous families that man has found the many different kinds of grain from which he derives his principal subsistence; and that, from reasons of consonance, not only the species, but several of the genera, nearly approach each other, that they may offer similar services to man under latitudes totally different. Thus the millet of Africa, the maize of Brasil, the rice of Asia, the sagopalm of the Moluccas, whose trunk is filled with a nutritious flour, correspond to the grain of Europe. We discover consonances of another kind in the same places, as if Nature had intended to multiply her benefits, by varying only the form, without changing scarcely any thing of their qualities. Thus, in our gardens, how delightful and how useful is the consonance between the orange and the lemon-tree, the apple and the pear, the walnut and the hazle; and in our farm-yards, that between the horse and the ass, the goose and the duck, the cow and the goat.

Farther each genus is in consonance with itself by means of the sexes. Between the sexes, however, there are contrasts which give the greatest energy to their loves, from the very opposition of contraries, from which, as we have seen, all harmony originates; but without the general consonance of forms that exists between them, sensible beings of the same genus would never have approached each other. Without this, one sex would have for ever remained a stranger to the other. Before either of them could have

observed what the other possessed that corresponded to its necessities, the time of reflection would have absorbed that of love, and would perhaps have extinguished desire. It is consonance that draws them together, and contrast that unites them. I cannot believe that in any genus of animal one sex is totally different from the other in exterior forms: and if differences actually exist, as some naturalists assert, in various fishes and insects, I am persuaded that Nature has placed the habitation of the male and the female very near to each other, and has prepared their nuptial couch at no great distance from their cradle.

But there is a consonance of forms much more striking than even that of the two sexes: I mean the duplicity of the organs which exists in each individual. Every animal is double. If you consider his two eyes, his two nostrils, his two ears, the number of his legs, disposed in pairs, you would be ready to say: here are two animals glued together and united under one skin. Even the parts of his body which are single, as the head, the tail, the tongue, appeared to be formed of two halves, joined together by sutures This is not the case with the members properly so called; for example, a hand, an ear, an eye, cannot be divided into two similar halves; but the duplicity of form in the parts of the body, essentially distinguishes them from members; for the part of the body is double and the member is single, the former is always alone, and the latter is always repeated. Thus the head and the tail of an animal are parts of his body, and the legs and the ears are his members.

This law, one of the most wonderful, though one of the least observed in Nature, destroys all the hypotheses which ascribe to chance the organization of beings; for, independent of the harmonies which it presents, it doubles at once the proofs of a Providence, which did not think it sufficient to bestow one principal organ on every animal for each particular element, such as, an eye for the light of the sun, an ear for the sounds of the air, the foot for the ground which is to support it, but determined besides that he should have every organ in pairs.

Some sages have considered this admirable arrangement as a foresight of Providence, that the animal might always have a substitute to supply the loss of any of his organs, exposed to various accidents; but it is remarkable that the interior parts of the body, which at the first sight appear single, present on examination, a similar duplicity of forms, even in the human body, where they are more confounded than in other animals. Thus the five lobes of the lungs, one of which has a kind of division; the fissure of the liver; the supernal separation of the brain, by the reduplication of the *dura mater;* the *septum lucidum*, similar to a leaf of talc, which separates its two anterior ventricles; the two ventricles of the heart and the divisions of the other viscera, announce this double union, and seem to indicate, that the very principle of life is the consonance of two similar harmonies.*

From this duplication of organs results utility much more extensive than if they were single. Man embraces with two eyes more than half the horizon: he would scarcely be able to take in a third part of it with a single one. With his two arms he performs an infinite number of actions, which he could never accomplish with one only, such as lifting upon his head a load of considerable size,

* Each organ is itself in opposition to the elements for which it is destined, so that from their mutual opposition springs an harmony which constitutes the pleasure experienced by that organ. This is exceedingly remarkable and confirms the principles which we have laid down. Thus the organ of vision, adapted principally to the sun, is a body which is opposite to him in this respect, that it is almost entirely acqueous. The sun emits luminous rays; the eye, on the contrary, is surrounded by dusky eye-lashes which over-shadow it. The eye is farther veiled by a lid, which it opens and shuts at pleasure, and it moreover opposes to the whiteness of the light, a tunic entirely black, called the *urea*, which clothes the extremity of the optic nerve.

The other parts of the body, in like manner, present oppositions to the action of the elements to which they are adapted. Thus the feet of animals which scramble over rocks have claws, as those of lions and tigers. The animals that inhabit cold climates are clothed with warm furs, &c. We must not, however, always expect to find these contraries of the same species in every animal. Nature possesses an infinite number of means to produce the same effects, according to the necessities of every individual.

and climbing up a tree. If he were supported by no more than one leg, his footing would not only be much less firm than upon two, but he would be unable to walk, and would be reduced to the necessity of crawling or hopping. This mode of advancing would be entirely discordant to the constitution of the other parts of his body and the different surfaces over which he is destined to travel.

If Nature has given to animals a single exterior organ such as the tail, the reason is, that its use, being very limited, extends but to a single action, to which it is fully equivalent. Besides, the tail, from its situation is secured from almost every danger. Farther, scarcely any but powerful animals have a long tail, as the bull, the horse, the lion The rabbit and the hare have a very short one. In feeble animals who have long tails, as the ray, it is armed with prickles, or grows again if it happens to be torn off by any accident, as in the case of the lizard. Finally, whatever may be the simplicity of its use, it is remarkable that it is formed of two similar halves like the other parts of the body.

There are other interior consonances, which collect, as it were diagonally, the different organs of the body, in order to form one only and single animal of these two halves. I shall leave to anatomists the investigation of this incomprehensible connection; but, be their knowledge ever so extensive, I doubt whether they will ever be able to trace the windings of this labyrinth. Why, for example, should the pain which attacks a foot, sometimes be felt in the opposite part of the head, and *vice versa?* I have seen a very astonishing proof of this consonance in a serjeant, who I believe, is still living in the Hospital of Invalids. This man, fencing one day with a comrade, who, as well as himself, made use of his sword in the sheath, received a thrust in the lacrymal angle of the left eye, which immediately deprived him of his senses. When he came to himself, which was not for several hours after the accident, he found himself completely paralytic in his right leg and

right arm, and no medical assistance has ever been able to restore the use of them.*

I shall here observe, that the cruel experiments daily made on animals to discover these sacred correspondencies of Nature, serve only to spread a thicker veil over them, for their muscles, contracted by fear and pain, impede the course of the animal spirits, accelerate the velocity of the blood, throw the nerves into a state of convulsion, and tend much rather to derange the animal economy, than to unfold it. These barbarous means employed by modern physics, have an influence still more pernicious on the morals of those who make use of them; for besides conveying false notions, they inspire them with the most atrocious of all vices, which is cruelty. If we might presume to interrogate Nature concerning the operations she conceals from us, I should think pleasure a much more proper subject than pain. Of the propriety of this sentiment I was witness to an instance at the country-seat of a young gentleman in Normandy. Walking in the adjoining fields with the proprietor, we perceived some oxen fighting; he ran towards them brandishing his stick, and the animals immediately separated. He then went up to the most ferocious of them, and began to scratch him with his fingers at the root of the tail. The animal whose eyes were still inflamed with rage, immediately became motionless, extending his neck, opening his nostrils, and snuffing the air with a pleasure which demonstrated, in a very amusing manner, the intimate correspondence between this extremity of hi body and his head.

* This man was a native of Franche Comté. I never saw him but once, and have forgotten his name and the regiment to which he belonged, but never shall I lose the recollection of his virtue, which was reported to me on good authority. When his misfortune obliged him to go to the hospital, he remembered that, as a serjeant, he had, by the instigation of his captain, inveigled a young country fellow, the only son of a poor widow, to inlist, and that he had been killed three months afterwards in battle. On the recollection of this act of cruelty and injustice, he resolved to abtain from wine. He accordingly sold his allowance and remitted the amount every six months to the mother whom he had robbed of her son

The duplication of organs is likewise observable in vegetables, especially in their most essential parts, such as the *antheræ* of the flowers which are double bodies; in their petals one half of which corresponds exactly to the other; in the lobes of their seed, &c. A single one of these parts, however, appears sufficient for the development and the generation of the plant. This observation might be extended to the very leaves, the two halves of which correspond in most vegetables, and if any of them deviate from this order, it is doubtless for some particular reason, well worthy investigation.

These facts confirm the distinction which we have made between the parts and the members of a body; for in the leaves in which this duplication occurs, we commonly find the vegetative faculty, which is diffused over the body of the vegetable itself; so that if you plant those leaves with care and at the proper season, you will see the complete vegetable produced from them. Perhaps it is because the interior organs of the tree are double, that the vegetative principle of life is diffused even into its slips, as may be seen in a great number, which shoot up from a branch. Nay there are some which have the faculty of perpetuating themselves from simple cuttings. Of this we have a noted instance in the Memoirs of the Academy of Sciences. Two sisters on the death of their mother, inherited an orange-tree. Each of them obstinately insisted on having it in her portion. At length neither of them being disposed to resign her claim, they agreed that the tree should be cut in two and that each should take her half. The tree accordingly shared the fate to which the child was doomed by Solomon. It was cleft asunder; each of the sisters replanted her half; and, wonderful to be related! the tree which the animosity of the sisters had divided, was covered with new bark by the hand of Nature.

It is this universal consonance of forms that has suggested to man the idea of symmetry. He has introduced it into most of the arts, and especially into architecture, as

an essential part of order. To such a degree in fact is it the work of intelligence and of combination, that I consider it as the principal character by which an organized body may be distinguished from such as are not organized and are only the results of a fortuitous aggregation, however regular their assemblage may appear; such are those produced by crystallizations, efflorescences, chemical vegetations, and igneous effusions.

Proceeding, after these reflections, to consider the globe of the earth, I observed with the utmost astonishment, that it too presented, like every organized body, a duplication of forms. I had imagined from the beginning, that the globe being the work of an intelligence, a certain order must of necessity pervade it. I had discerned the utility of islands, and that of banks, reefs, and rocks, to defend the most exposed parts of continents against the currents of the ocean, at the extremities of which they are always situated. I had likewise discovered the utility of bays, which, on the contrary, are removed from the currents of the ocean, and hollowed out into deep recesses to shelter the mouths of rivers, and to serve, from the tranquillity of their waters, as an asylum to the fishes, which, in every sea, retire to them in shoals to collect the spoils of vegetation and the alluvions of the land that are there discharged by the rivers. I had admired, in detail, the proportions of their different structures, but had formed no conception of their combination. My mind was bewildered amid so many intersections of land and sea, and I should have ascribed them without hesitation to chance, if the order, which I had perceived in each of the parts, had not led me to suspect the existence of an order likewise in the totality of the work.

I am now about to display the globe under a new aspect I request the reader to forgive this digression, which is a fragment of the materials I had collected relative to geography, and tends to prove the universality of the laws of Nature, for the existence of which I am contending.

shall be, as usual, rapid and superficial; but it is of little importance whether I weaken ideas which I have not been permitted to arrange in their natural order, if I can only transmit the germ of them into heads possessing intelligence superior to my own.

I first sought the consonances of the globe in its northern and southern division. But so far from discovering resemblances between them, I perceived nothing but oppositions; the first being, in a manner, only a terrestrial hemisphere, and the other a maritime hemisphere, so totally different that the winter of the one is the summer of the other, and the seas of the former seem to be opposed to the lands and islands scattered over the latter. This contrast presented to me another analogy with an organized body; for, as we shall see in the following articles, every organized body has two halves in contrast, as there are two in consonance.

I found in it, then, under this new aspect, a certain analogy with an animal whose head is directed towards the north, by the magnetic attraction peculiar to our pole, which seems to fix there a *sensorium*, as in the head of an animal; the heart under the Line, from the constant heat which prevails in the torrid zone, and seems to determine it as the region of the heart; lastly, the excretory organs in the southern part, where the greatest seas, which are the receptacles of the alluvions of continents, are situated, and in which are likewise found the greatest number of volcanoes, which may be considered as the excretory organs of the seas, whose bitumens and sulphurs they are continually consuming. Besides, the sun, who remains five or six days longer in the northern hemisphere, seemed to present me a more marked resemblance to the body of an animal, in which the heart, the centre of heat, is a little nearer to the head than to the lower extremities.

Though these contrasts appeared to me sufficiently determinate to manifest an order on the globe, and though similar ones may be observed in vegetables, distinguished

as they are into two parts, opposite in functions and in forms, such as the leaves and the roots, I was fearful of indulging my imagination and of generalizing, through the weakness of the human mind, those laws of Nature, peculiar to every existence, by extending them to kingdoms not susceptible of their application.

But I ceased to doubt of the general order of the earth, when, with two halves in contrast, I perceived two others in consonance. I was struck with astonishment, I must confess, when I observed in the duplication of forms which constitute its body, members exactly repeated on either side.

The globe, if it be considered from east to west, is divided, like organized bodies, into two similar halves, which are the Old and New World. Each of their parts corresponds in the eastern and western hemisphere; sea to sea, island to island, cape to cape, peninsula to peninsula. The lakes of Finland and the gulf of Archangel corresponds to the lakes of Canada and Baffin's Bay; Nova Zembla to Greenland; the Baltic Sea to Hudson's Bay; the islands of Great Britain and Ireland which cover the first of those Mediterraneans to the islands of Welcome and Good Fortune, which protect the second; the Mediterranean, properly so called, to the gulf of Mexico, which is a kind of Mediterranean formed, in part, by islands. At the extremity of the Mediterranean is situated the isthmus of Suez, in consonance with the isthmus of Panama placed at the bottom of the gulf of Mexico; below these isthmuses, the peninsula of Africa presents itself on the one hand and the peninsula of South America on the other. The principal rivers of those divisions of the globe are facing each other; for the Senegal discharges itself opposite the river of Amazons. Lastly, each of these peninsulas, advancing towards the south pole, is terminated by a cape equally noted for tempests, the Cape of Good Hope and Cape Horn.

Between these two hemispheres there are many other

points of consonance, on which I shall not enlarge. All these points, it must be admitted, do not correspond in the same latitudes: but they are disposed in a spiral line, winding from east to west, and extending from north to south, so that these corresponding points come in progression. They are nearly in the same latitude, setting out from the north, as the Baltic Sea and Hudson's Bay, and they lengthen in America in proportion as it advances towards the south. This progression is likewise perceptible throughout the whole length of the ancient continent, as may be seen from the form of its capes, which, taking the point of departure from the east, extend so much the more towards the south as they advance towards the west; such as the Cape of Kamtschatka in Asia, Cape Comorin in Hindostan, the Cape of Good Hope in Africa, and lastly Cape Horn in America. These differences of proportion proceed from this, that the two terrestrial hemispheres are not projected in the same manner; for the old continent has its greatest length from east to west, and the new one from north to south; and it is manifest that this difference of projection has been ordained by the Author of Nature, for the same reason that caused him to bestow double parts on the animals and vegetables, in order that if necessity required, either might supply what was deficient in the other, but principally that they might be enabled to render mutual assistance.

If, for example, there existed only the ancient continent, with the South Sea alone, the motion of this sea, being too much accelerated under the Line by the regular east winds, would advance, after having made the circuit of the torrid zone, and dash with tremendous violence against the islands of Japan; for the size of the billows of the sea is always in proportion to its extent. But from the disposition of the two continents, the waves of the great eastern current of the Indian Ocean are partly retarded by the archipelagoes of the Moluccas and of the Philippines; they are likewise broken by other islands, as

the Maldives, by the Capes of Arabia and that of Good Hope, which throws them back toward the south. Before they reach Cape Horn, they encounter new obstacles from the current of the south pole, which then crosses their course, and by the change of the monsoon, which totally destroys the cause of it at the end of six months. Thus there is not a single current, whether eastern or northern, that traverses over only one fourth part of the globe in the same direction. Besides, the division of the parts of the world into two is so necessary to its general harmony, that if the channel of the Atlantic which separates them were not in existence, or were partly filled up, as it is supposed once to have been by the great island of Atalantis,* all the eastern rivers of America and all the western ones of Europe would be dried up, since those rivers are supplied only by the clouds emanating from that sea. Moreover, the sun, enlightening on our side, only a terrestrial hemisphere, all the mediterraneans of which would disappear, must burn it up with his rays; and warming, on the other side, nothing but a maritime hemisphere, most of the islands of which would be deluged, because the quantity of that sea would be increased by the reduction of ours, an infinite quantity of vapor would rise in waste.

It would appear to be from these considerations that Nature has not placed the greatest length of the continents but only the mean breadth of Africa and America in the torrid zone, because the action of the sun would there have been too violent. On the contrary, she has there placed the largest diameter of the South Sea, and the greatest breadth of the Atlantic Ocean, and there collected the greatest quantity of islands in existence. She has farther placed in the breadth of the continents, which she has there widened out, the greatest currents of fresh water that are to be found in the world, all issuing from mountains of ice, such as the

* A fabulous island, imagined by Plato to represent allegorically the government of Athens, as several learned men have demonstrated.

Senegal and the Nile, which arise in the Mountains of the Moon in Africa, the Amazons and the Oronoko whose sources are in the Cordilleras of America. It is likewise for the same reason that she has multiplied, in the torrid zone and in its vicinity, the lofty chains of snow-covered mountains, and that she directs thither the winds of the north and of the south pole, of which the trade winds always partake; and it is very remarkable that many of the great rivers which flow there, are not situated precisely under the Line, but in parts of the torrid zone which are hotter than the Line itself. Thus the Senegal rolls its current in the vicinity of Zaara, or the Desert, which according to the testimony of all travellers, is the most scorching part of Africa.

From all this we may perceive the necessity of two continents, which mutually serve as a check to the movements of the ocean. It is impossible to conceive that Nature could have disposed them in any other manner than by extending one of them lengthwise and the other breadthwise, that the opposite currents of their seas may counterbalance each other, and that thence might result a harmony adapted to their shores and to the islands enclosed within their basons. If you suppose these two continents projected circularly from east to west, under the two temperate zones, the circulation of the sea, comprehended between would be, as we have seen, too much accelerated by the constant action of the east wind. There would no longer be a maritime communication from the Line to the poles, consequently there would be no icy effusions in that ocean, no tides, no cooling, no renewal of its waters. If, on the contrary, you suppose both continents, extending from north to south, like America, there would then be no eastern current in the ocean; the two halves of each sea would meet in the midst of their channel and their polar effusions would there encounter each other with an impetuosity o which the icy effusions that precipitate themselves from the Alps, with all their devastations, convey but a faint

idea But by the alternate and opposite currents of our seas, the icy effusions of our pole proceed, in summer, to cool Africa, Brasil and the southern parts of Asia, doubling the Cape of Good Hope, by the monsoon, which then carries the current of the ocean towards the east; and during our winter the effusions of the south pole proceed toward the west to moderate on the same shores the action of the sun, which is there unremitting. By means of these two spiral and retrograde motions of the seas, resembling those of the sun in the heavens, there is not a drop of water but what may make the circuit of the globe, be evaporated under the Line, be reduced to rain on the continent, and to ice under the pole. These universal correspondences are so much the more worthy of remark, as they enter into all the plans of Nature, and exist in the rest of her works.

From any other order would result inconveniencies which I leave the reader to discover. Hypotheses *ab absurdo* are both amusing and useful; it is true, they change natural proportions into caricatures, but they are attended with this advantage, that while they convince us of the weakness of our understandings, they fill us with a profound sense of the wisdom of Nature. Let us recollect the method of Socrates. Let us not waste our time in confuting systems which present to us plans different from those we see. Let us only deduce consequences from them: to admit is to overturn them.

I could farther demonstrate that most of the islands themselves have double parts, like the continents, of which, as we have elsewhere said, they are miniatures, from their peaks, their mountains, their lakes, and their rivers, proportioned to their extent. Many of those situated in the Indian Ocean have, as it were, two hemispheres, the one eastern, the other western, divided by mountains which run from north to south, so that when it is winter on one side, summer reigns on the other, and *vice versa;* such are the islands of Java, Sumatra, Borneo, and most of the

Phillippines and Moluccas, so that they are evidently constructed for the two monsoons of the sea in which they are placed. Did time permit, the varieties of their construction would suggest many curious remarks, which would confirm in detail what I have said respecting the consonances of the globe in general. For my own part I believe these principles of order to be so certain, that I am persuaded it would be possible, on inspecting the plan of an island with the elevation and the direction of its mountains, to fix its longitude and latitude and to determine what winds blow there with the greatest regularity. Nay I farther believe that, with these last data, we might *vice versa*, trace the plan and section of an island, in whatever part of the ocean it may be situated. I except, however, the fluviatic islands, and those which being too small of themselves, are collected into groups, as the Maldives, because these islands have not the centre of all their harmonies within themselves, but are adapted to rivers, to archipelagos and to neighbouring continents. The reader may easily satisfy himself that I advance no paradox, by comparing between the tropics, the general form of the islands which are exposed to two monsoons, and that of the islands subject to the regular influence of the east wind. We have just observed that Nature has given, in a certain degree, two hemispheres to the first, by dividing them through the middle by a chain of mountains running north and south, that they might receive the alternate influences of the east and west winds which blow there, by turns, six months in the year; but in the islands situated in the South Sea and Atlantic Ocean, where the east wind blows continually from the same quarter, she has placed the mountains at the extremity of their territory in the part most to windward, that the streams and the rivers, formed from the clouds accumulated by the winds on their peaks, may flow through the whole extent of these islands.

I know perfectly well that I have elsewhere stated these last observations. But I here present them in a new light.

Besides, should I fall into some repetitions, there can be no harm in repeating new truths and some indulgence is due to him who announces them.

OF PROGRESSION.

PROGRESSION is a series of consonances ascending or descending. Wherever we meet with progression, it produces great pleasure, because it excites in our souls the sentiment of infinity so congenial to our nature. I have already said, and cannot repeat too frequently, that physical sensations delight us only by awakening within us intellectual sentiments.

When the leaves of a vegetable are arranged round its branches, in the same order that the branches themselves are placed round the stem, there is consonance, as in pines; but if the branches of this vegetable are farther disposed among themselves in similar planes, which continue to diminish in magnitude, as in the pyramidal form of the fir, there is progression; and if these trees are themselves disposed in long avenues, decreasing, like their individual masses in height and coloring, our pleasure is augmented because the progression becomes infinite.

From this instinct of infinity it is that we take pleasure in the sight of every thing that presents us with a progression; as nurseries, containing plants of different ages, hills closing the horizon in successive elevation, prospects which have no limits.

Montesquieu has nevertheless remarked, that, if the road from Petersburgh to Moscow were a straight line, the traveller must inevitably perish of languor. I have performed the journey and can affirm that it is far from being in a straight line. But supposing that it were, the languor of the traveller would arise from the very sentiment of infinity, added to the idea of fatigue. It is this same sentiment, so delicious when it mingles with ou pleasures, that overwhelms us with anguish w

to calamity; this we experience but too frequently. I believe, however, that an unbounded prospect would at last fatigue us, from presenting infinity to us always in the same manner; for our souls not only possess the instinct of infinity, but likewise that of universality, or, of every possible modification of infinity.

Nature does not form perspectives with one or two consonances, after our manner; but she composes them of a multitude of different progressions, by introducing those of plans, magnitudes, forms, colors, motions, ages, kinds, groups, seasons, latitudes, and joining to these an infinity of consonances deduced from reflections of light, of waters, of sounds. I shall suppose that she had been limited to the plantation of an avenue from Paris to Madrid, with a single genus of trees, such as the fig. I doubt whether we should tire in travelling it. We should see trees bearing figs of the species, called by the Latins, *mamillanæ*, because they resemble a woman's breasts; others with fruit quite red, and not larger than an olive, such as those of Mount Ida; others bearing white, black; others of the color of porphyry, and for that reason called by the ancients porphyrites. We should likewise perceive among them the fig-tree of Hyrcania, loaded with more than two hundred bushels of fruit; the ruminal fig the species beneath whose shade Romulus and Remus were suckled by a she-wolf; the fig-tree of Hercules; in a word the twenty-nine species enumerated by Pliny, and many other varieties unknown to the Romans and to us. Each of these species of trees would exhibit vegetables of different sizes, young, old, single and in clusters; some planted on the banks of streams, others issuing from the clefts of rocks. Each tree would present the same variety in its fruits exposed on one single foot, as it were, to different latitudes, to the south, to the north, to the east, to the west, to the sun, and to the shade of the leaves. Some would be green and just beginning to appear, others violet and cracked, having their crevices stored with honey. On the other hand, w

should find some under different latitudes, in the same degree of maturity, as if they hung upon the same tree; those that grow in the north at the bottom of the vallies being sometimes as forward as those that are situated much farther to the south on the summits of the mountains.

These progressions are discovered in the minutest works of Nature, of which they constitute one of the principal charms. They are not the effect of any mechanical law. They have been bestowed on each vegetable, to prolong the enjoyment of its fruits according to the necessities of man. Thus the aqueous and cooling fruits, such as the red fruits, appear only in the hot season, others which, from their substantial flour and their oils, are necessary during winter, such as chesnuts and walnuts, may be preserved a considerable part of the year. But those which are designed to supply the accidental wants of mankind, for instance of travellers and navigators, remain on the earth in all seasons. These are not only inclosed in shells adapted to their preservation, but they appear on the trees in every season of the year, and in every stage of maturity. In the East Indies, on the uninhabited shores of islands,* the cocoa-tree bears at once twelve or fifteen bunches of cocoa-nuts, some of which are still in the bud, others are in the flowers, others set, others full of milk and others quite ripe. It is not the heat of the tropics that give to it a fecundity so constant and so varied, for in the Indies, as in our climates, the fruits of trees have seasons in which they ripen and after which they are no more seen. I know of none but the cocoa and the banana that bear fruit all the year round. The last-mentioned tree is, in my opinion the most useful in the world, because its fruit may serve for food without any preparation, having an agreeable flavor and possessing very nutritious qualities. It produces a clustre of sixty or eighty fruit which ripen all at once, but it pushes out shoots of every size, which bear in suc-

* See Francis Pyrard's Voyage to the Maldives.

cession and at all seasons. The progression of the fruits of the cocoa is in the tree, and that of the fruits of the banana in the plantation. In every instance, that which is the most useful is likewise the most common.

The productions of our corn-fields and of our vineyards exhibit dispositions still more wonderful, for though the ear of corn has several faces, its grains come to maturity at the same time, from the moveableness of its stalk which presents them to all the aspects of the sun. The vine grows in the form neither of a bush, nor of a tree, but in that of an espalier, and though its berries are arranged in clusters, their transparency renders every one of them susceptible of being penetrated by the rays of the sun. Thus Nature obliges men, by the spontaneous maturity of the fruits destined for the general support of human life, to unite their labors and to assist each other in the toils of the harvest and of the vintage. The corn-field and the vineyard are the most powerful bonds of social union. Ceres and Bacchus were accordingly considered in ancient times, as the first legislators of the human race. The ancient poets often bestow on them this appellation. An Indian under his banana and his cocoa-tree is able to dispense with the assistance of his neighbour. It is, I should imagine, from this reason, rather than from the effect of the climate, which is there so mild, that so few republics, and so many governments founded on force exist in India. One man can there exercise no influence over the field of another except by his ravages, but the European who sees his harvest grow yellow and his grapes blacken all at once, hastens to call not only his neighbours, but strangers who happen to pass by, to assist him in reaping his crop. But though Nature has denied our corn and our vines the faculty of producing fruit at all seasons of the year, she has bestowed on the flour of the one, and the wine of the other, the quality of keeping for ages.

All the laws of Nature have a reference to our necessi-

ties; not only those which are evidently contrived for our comfort, but others frequently concur to this end so much the better, the more they appear to deviate from it.

OF CONTRASTS.

Contrasts differ from contraries in this, that the latter act only in one single point, and the former only in their general combination. An object has only one contrary, but it may have many contrasts. White is the contrary of black, but it contrasts with blue, green, red, and many other colors.

Nature, in order to distinguish the harmonies, the consonances, and the progressions of bodies from each other, places them in contrast. This law is so much the less observed, the more common it is. We trample under foot truths the most wonderful and the most important, without paying the slightest attention to them.

All naturalists look upon the colors of bodies as purely accidental, and most of them consider their very forms as the effect of some attraction, incubation, crystallization, &c. Books are every day written with a view to extend by analogies, the mechanical effects of these laws to the different productions of Nature; but if they actually possess so much power, how comes it, that the sun, that universal agent, has not filled the heavens, the waters, the earth, the forests, the fields, and all the creatures over which he possesses so much influence, with the uniform and monotonous effects of his light? Like him, all these objects ought to appear either white or yellow, and to be distinguished from each other only by their shades. A landscape ought to exhibit no other effects than those of a cameo or of an engraving. Latitudes, we are told, diversify their colors; but if latitudes have this power, how happens it that the productions of the same climate and of the same field are not always of the same hue? Whence comes it that the quadrupeds which are born and pass their lives in

the meadows, do not produce young ones green as the grass on which they feed?

Nature has not satisfied herself with establishing particular harmonies in each species of beings, to characterize them; but that they might not be confounded among themselves, she forms contrasts with them. We shall see in the following Study for what particular reason she has given the grass a green color in preference to any other. She has, in general, made the grass green, to form a contrast with the earth, and has given an earth-color to the animals which live on herbage, to distinguish them, in their turn from the ground on which they stray. This general contrast may be remarked in herbivorous quadrupeds, such as the domestic animals, the fawn-colored beasts of the forests, and in all the granivorous birds which live among herbage or in the foliage of the trees, as the hen, the partridge, the quail, the lark, the sparrow, which have earthy colors, because they reside among the verdure. Those, on the contrary, that live on dusky grounds are clothed in brilliant hues, as the blueish tom-tit, and the woodpecker, which climb up the bark of trees in pursuit of insects.

Nature universally opposes the color of the animal and that of the ground on which it lives. This admirable law is without exception. I shall here produce a few examples of it, to put the reader in the way of observing those enchanting harmonies, of which he will find proofs in every climate. On the shores of India is seen a large and beautiful bird, white and fire-colored, called the flamingo, which name has been given her on account of her appearance at a distance, like a flame of fire. She commonly frequents lagoons and salt marshes, in the waters of which she constructs her nest, by raising out of it at the depth of a foot, a small hillock of mud a foot and a half above the surface. At the top of this hillock she makes a hole, lays two eggs, and hatches them in a standing posture, with her feet in the water, by means of her long legs. When several of these birds are on their nests in the midst of a lagoon, they

would be taken at a distance for the flames of a conflagration, issuing from the bosom of the waters.* Other birds exhibit contrasts of a different kind on the same shores. The pelican is white and brown, and has a large pouch under her bill, which is of excessive length. She goes every morning to fill this pouch with fish, and having completed the supply of the day, she perches on the point of some rock on a level with the surface of the water, where she remains motionless till night, "as if in a state of profound sorrow," says father Dutertre, "her head drooping from the weight of her long beak, and her eyes fixed on the agitated ocean, without moving any more than if she were of marble." On the dusky strands of those seas are frequently observed herons white as snow, and in the azure plains of the sky, the bird of paradise of a silvery white skimming through them at a distance almost too great for the eye to reach: she is sometimes tinged with a roseate hue, and has the two long tail-feathers of a flame color like that of the South Seas

* The flamingo forms the connecting link among the feathered tribes between the Linnæan orders of the Waders and the Swimmers, partaking of the characters of both. The body of the bird is about the size of that of a goose, but the legs and neck are of such extraordinary length, that when he stands upright he measures from five to six feet in height. The flamingo is one of the few birds common to the regions both of the old and new world, but he frequents only the tropical and temperate climates. The manner in which these birds hatch their eggs, as described above by the author, is an additional illustration of the wonderful manner in which Providence has adapted the instincts of animals to their circumstances or necessities. The legs of the flamingo are extremely long and as the female builds her nest on the ground she could not without injury to her eggs, put her feet into the nest, or sit, or rest her whole weight upon it, but by means of that admirable instinct with which Nature has endowed her.—These birds are scarcely ever seen but in troops, and when beheld at a distance ranged beside each other, on the shores of the rivers, searching for food, they have the appearance of a regiment of soldiers. They are even observed to place themselves in rows when in a state of repose. On these occasions they station one of their number to keep watch; when alarmed by any object he raises a cry which is heard to a great distance and very much resembles the sound of a trumpet. The whole flock are instantly on the wing and in their flight observe an order similar to that of the cranes. When they are surprized, however, they are rendered motionless and stupified with terror, so that every one of them may be killed before they attempt to stir from the spot.—These beautiful birds are very easily tamed and their flesh is reckoned extremely delicate. T

In many cases, the more dull the ground is, the more brilliant are the colors in which the animal destined to live upon it, is arrayed. We have not perhaps in Europe, any insect with richer clothing than the dung-beetle, and the fly which is distinguished by the same epithet. This last is brighter than gold and polished steel; the other of a hemispherical form, is of a fine blue, inclining to purple, and to render the contrast still more complete, exhales a strong and agreeable odor of musk.

Nature seems, sometimes, to deviate from this law, but it is from other reasons of conformity to which she reduces all her plans. Accordingly, though she has contrasted with the ground on which they live, those animals which from their strength and agility are able to escape from every danger, she has confounded with it those whose slowness or weakness would place them in the power of their enemies. The snail, destitute of sight, is of the color of the bark of the trees which he gnaws, or of the wall in which he takes refuge. Flat fishes, which are bad swimmers, as the turbot, the flounder, the plaice, the sole, and others, which are cut out, as it were, like planks, because they were destined to lead a sedentary life at the bottom of the sea, are of the color of the sands where they seek their nourishment, being spotted like them with grey, yellow, black, red, and brown. It is true they are thus speckled only on one side; but they are so strongly impressed with the sense of this resemblance, that when they find themselves inclosed within the parks formed upon the beach to entrap them, and perceive the tide retiring, they bury their fins in the sand, waiting the return of the tide, and exhibit only their deceitful side to the eye of man. It has such a perfect resemblance to the ground on which they conceal themselves, that it would be impossible for the fishermen to distinguish them from it, without the help of sickles, with which they scratch in every direction on the surface of the sand, to detect by the touch what the eye cannot discover. This I have witnessed oftener than once, with much greater

admiration of the artifice of these fishes, than that of the fishermen. The ray, on the contrary, which is likewise a flat fish and a bad swimmer, but carnivorous, is marbled with white and brown, that he may be perceived at distance by the other fishes; and to prevent him, in his turn, from being devoured by his enemies, who are very alert, such as the seadog, or by his own companions who are extremely voracious, he is furnished with sharp prickles, particularly on the posterior part of the body, as the tail, which is most exposed to attacks when he is pursued.*

In the colors of innoxious animals Nature has bestowed at the same time contrasts with the ground on which they live, and consonances on that which is adjacent. She has likewise endowed them with the instinct of availing themselves of these alternately, according as circumstances may require. These wonderful accommodations may be observed in most of our small birds, whose flight is feeble and of short duration. The grey lark seeks her subsistence among the grass of the fields. Does any thing terrify her? she steps between two clods of earth where she becomes invisible. In this post she is so quiet that she scarcely quits it till the foot of the fowler is ready to crush her. The same is the case with the partridge. I have no doubt that these defenceless birds have a sense of these contrasts and conformities of color, for I have observed it even in insects. In the month of March last, I perceived on the bank of the river of the Gobelins, a brick colored butterfly, reposing, with expanded wings, on a tuft of grass. I approached and he flew away. He alighted at the distance of a few paces, on the ground, which, in that spot was

* The ancients were of opinion that there was no cure for a wound inflicted by the spine of the ray. The enchantress Circe, they say armed her son with a spear headed with one of these spines, as the most irresistable weapon she could furnish him with; and that he unintentionally slew with it his father Ulysses.—Even modern naturalists, and among them the celebrated Linnæus, have thought the spine of this fish venomous. Dr. Bloch, however, ventures to differ from them, and asserts that a wound inflicted by it is no more dangerous than one given by any similar instrument. T.

of his color. I approached him a second time; again he flew off and took refuge on a similar stripe of earth. In a word, I could not oblige him to settle on the grass, though I frequently tried, and though the spaces of earth which separated the patches of green turf were both narrow, and few in number. This wonderful instinct is particularly conspicuous in the cameleon. This kind of lizard whose motion is extremely slow is indemnified for this, by the incomprehensible faculty of assuming, at pleasure, the color of the ground by which he is encompassed. With this advantage, he is enabled to elude the eye of the pursuer who would otherwise soon overtake him. This faculty is in his will, for his skin is not a mirror. It reflects only the colors of objects and not their forms. What is farther remarkable, and perfectly ascertained by naturalists, though they assign no reason for it, is this, that he can assume all colors, as brown, grey, yellow, and especially green which is his favorite color, but not red. Cameleons have been placed for weeks together among scarlet cloth without assuming the slightest tint of that color. Nature seems to have refused them that glaring hue, because it could serve only to render them conspicuous at a distance, and farther, this is not the color of any ground, either of earth or vegetables on which these animals pass their lives.*

* The cameleon possesses another faculty not less astonishing than that of changing his color but not equally well known. He is capable of contracting or dilating himself at pleasure. The cause of this expansion is the air which he inhales, and which does not only remain in his breast, stomach, and intestines, but penetrates every part of his body so completely, that his whole frame is filled even to the extremity of the tail, as well as the eyes which become more full and more prominent. "The faculty of becoming bloated," says M. Golberry, in his fragments on Africa, "so as to appear absolutely round and fat, of remaining in that state whole months, or only a few hours, and afterwards of emptying himself, so as to exhibit a body completely meagre and exhausted, in so much that his spine becomes quite sharp, while the skin of his flanks collapses so as to seem only one piece, is, undoubtedly, one of the most extraordinary circumstances in the history of the cameleon: its cause is least known and seems most worthy of the attention and investigation of naturalists." T.

But in the age of weakness and inexperience, Nature confounds the colors of innocent animals with those of the grounds on which they live, without allowing them the choice of an alternative. The young of pigeons and of most granivorous birds are covered with a greenish shaggy coat, resembling the mosses of their nests. Caterpillars are blind, and have the colors of the bark and foliage on which they subsist. Nay even the young fruits, before they are armed with thorns, with cases, with bitter pulp and hard shells, which protect their seed, are, during the season of their expansion green like the leaves by which they are surrounded. Some embryos, it is true, as those of certain kinds of pears, are red or brown; but they are then of the color of the bark of the tree to which they belong. When these fruits have their seeds inclosed in pippins or stones, and these are out of danger, they then change their color. They become yellow, blue, gold-colored, red, black, and give to the vegetables which bear them their natural contrast. It is extremely remarkable that whenever a fruit changes its color, the seed has arrived at a state of maturity. Insects, having, in like manner, laid aside their robes of infancy, and being abandoned to their own experience, spread over the world to multiply its harmonies, with the attire and the instincts which Nature has conferred on them. Then it is that clouds of butterflies, which, in their caterpillar state, were confounded with the verdure of the plants oppose the colors and the forms of their wings to those of the flowers; the red to the blue, the white to the red, the *antennæ* to the *stamina*, and fringes to the *corollæ*. I was, one day, struck with admiration of one, whose wings were azure, and dotted with specks of the color of aurora, reposing on the bosom of a full-blown rose. He seemed to be disputing the palm of beauty with the flower. It would have been difficult to determine, to which to adjudge the prize, to the butterfly or to the rose; but on seeing the flower crowned with wings, of lapis lazuli, and

the azure insect extended in a cup of carmine, it was obvious that their charming contrast enhanced their mutual beauty.

Nature does not employ these conformities and these agreeable contrasts in noxious animals, nor even in dangerous vegetables. Of whatever kind the carnivorous or venomous animals may be, they form, at every age, and wherever they are, harsh and disagreeable oppositions. The white bear of the north announces his coming over the snows by a hollow noise, by the blackness of his snout and his paws, and by a throat and eyes of the color of blood. The ferocious beasts which seek their prey in the gloom of night or in the obscurity of the forests, give notice of their approach by loud roarings, lamentable cries, eyes enflamed, urinous or fetid smells. The crocodile, ambushed on the banks of the rivers of Asia, where he assumes the appearance of the trunk of an uprooted tree, betrays himself from afar by a strong smell of musk. The snake, concealed in the savannas of America, cannot stir beneath the grass without sounding his tremendous rattle. The very insects which make war on others, are clothed in colors harshly opposed, in which black particularly predominates, and clashes with white or with yellow. The humble-bee, independently of his buzzing noise, announces himself by the blackness of his corslet and his large body bristled with yellow hairs. He appears among the flowers like a burning coal that is half extinguished. The carnivorous wasp is yellow and striped with black like the tiger. But the useful bee is of the same color as the stamina and the *calices* of the flowers among which she collects her innocent harvest.

Poisonous plants exhibit, like noxious animals, disagreeable contrasts, from the faded colors of their flowers, in which black, coarse blue, and smoaky violet are in harsh opposition with delicate tints; from their nauseous and virulent smells; their shaggy foliage, of a dark green hue, clashing with white on the under-side; such are the tribes of wolfs-bane.

I am acquainted with no plants of an appearance so disgusting as those of this family, and among others that which we denominate *napel* and which is the most venemous vegetable of these climates. I know not whether the embroyos of their fruits present, from the first moments of their development, harsh oppositions which announce their noxious characters: if they do, they have this farther resemblance to the young of ferocious beasts.

Those animals which live on two different grounds have two contrasts in their colors. Thus, for example, the king-fisher which skims along the rivers, is at the same time of the color of musk and tinged with azure, so that he is distinguished from the dusky hue of the shores by the latter, and from the azure of the waters by the former. The drake, which dabbles on the same shores has the body tinged with an ash-color, and the head and neck of an emerald green, so that he is perfectly distinguishable by the grey color of his body from the verdure of the reeds and rushes among which he paddles, and by the green of his head and neck from the black mud in which he seeks his food, and with which, by another most astonishing contrast, he never soils his plumage. The same contrasts of colors are observed in the wood-pecker, who lives on the trunks of trees up which he climbs in quest of the insects that take shelter under their bark. This bird is both of a brown and of a green color, so that though he lives, properly speaking, in the shade, he is, however, always discernible on the trunks of the trees; for part of his plumage being of a bright green forms a striking contrast with their dusky bark, while the color of his feathers which is brown, distinguishes him from their mosses and their lichens. Nature opposes then the colors of every animal to those of the ground on which it lives; and what confirms the truth of this great law is, that most of the birds which live on one ground only, have no more than one color, and that one forms a striking contrast with the color of the ground.

Thus the birds which live aloft in the air, on the azure ground of the heavens, or on that of the waters in the midst of lakes, are in general white, which of all colors forms the most striking contrast with blue, and is consequently the most proper to render them perceptible at a distance, Such are, between the tropics the bird of paradise, of a satin white, which flies through the upper regions of the atmosphere; the heron, the sea-mew, the gull, which skim along the surface of the azure deep, and the swans sailing in fleets amid the lakes of the north.

There are likewise others which, to form a contrast with those already mentioned, are rendered conspicuous, in the sky or on the waters, by their black or dusky hues: such are, for example, the crow of our climates, which is perceptible at such a distance in the heavens, on the white ground of the clouds; several brown and black sea-fowls, as the man-of-war bird of the tropics, which sails sportively through the air amidst storms and tempests; and the sea-mower, who cuts with his black wings, in the form of a scythe, the white surface of the foaming billows of the ocean.

From these examples, therefore, it may be inferred, that when any animal has but one single tint, he is intended only for one situation, and that when he unites in himself the contrast of two opposite hues, he lives on two grounds, the colors of which are determined by that of the plumage, or of the coat of the animal. We must, however, be upon our guard against the unlimited generalization of this law, and admit those exceptions which wise Nature has established, for the very preservation of animals. She has, for example, whitened them, in general, in the north, in the winter season, and on the lofty mountains, to preserve them from the excessive cold, by clothing them in a color which most reflects heat; and has embrowned them, in the ardors of summer, and on sandy plains, to shelter them from the effects of the heat, by painting them with negative colors. That these great effects of harmony are not

mechanical results of the influence of the bodies which surround animals, or of the apprehensions of the mother on the tender organs of the fœtus, or of the action of the sun's rays on their feathers, by which our systems of physics have hitherto attempted to explain them, is evidently demonstrated by this circumstance; that, among the almost infinite number of birds which pass their lives in the higher regions of the air, or on the surface of the sea, whose colors are azure, there is not a single blue one, and that, on the contrary, many birds which live between the tropics, in the bosom of black rocks or in the shade of gloomy forests are azure-colored: such are the Batavia hen, which is blue all over, the Dutch pigeon of the Isle of France and various others.

From these observations we may deduce another consequence equally important; it is, that all these harmonies are made for man. A blue bird on the azure ground of the sky, or on the surface of the water would elude our sight. Besides, Nature has reserved the rich and agreeable colors only for birds which live in our vicinity. This is so true, that, though the sun acts between the tropics with the whole energy of his rays on those fowls whose residence is the wide ocean, not one of them is arrayed in plumage of beautiful colors; while those that inhabit the shores of the sea and of rivers, are frequently dressed in the most gorgeous attire. The flamingo, a large bird which lives in the lagoons of the South Seas, has a white plumage, tinged with carmine. The toucan, on the same strands, has an enormous beak of the most brilliant red; and when he draws it from the bosom of the humid sands, in which he seeks his food, you would think that he had brought up a lump of coral. There is another species of toucan, whose beak is white and black, as highly polished as though it were made of ebony and ivory. The guinea-hen, with speckled plumage, the peacock, the duck, the king-fisher, and a multitude of other river birds, embellish by the enamel of their colors the banks of the Asiatic and

African streams. But we find nothing that can be compared to them in the plumage of those that reside on the open sea, though they are still more exposed to the influence of the sun.

It is in consequence of these conformities with man, that Nature has given the birds which live remote from him cries shrill, hoarse, and piercing, but which are as proper as the opposition of their colors to render them perceptible at a distance amid their wild retreats. She has bestowed, on the contrary, sweet tones and harmonious voices on the small birds which frequent our groves, and fix their abode in our habitations, that they may heighten their charms, as well by the melody of their notes, as by the beauty of their colors. In order to confirm the truth of the principles of harmony which we are laying down, we repeat, that Nature has established an order of beauty in the plumage and song of birds so real, that she has endowed with this advantage such birds only whose lives are in some measure innocent relatively to man, as those which are granivorous, or subsist on insects; and she has refused it to birds of prey and to most sea-fowl, which have, in general, earthy colors and disagreeable cries.

All the kingdoms of Nature present man with the same conformities, the very abysses of the ocean not excepted. The fishes which subsist on animal food, like the whole class of cartilaginous fishes, such as the sea-dog, the shark, the ray, the polypus, have colors and forms that are disgusting. Such as live in the open sea have colors marbled wtih white, black, brown, by which they are distinguished in the bosom of the azure billows; such as the whale, the porpoise, &c. But it is among those that inhabit the dusky shores, and particularly in the number of such as are called sexatile, because they live among rocks, that we find some whose skin and scales surpass the utmost efforts of the pencil, especially when they are alive. It is thus that legions of mackarel make the northern strands of Europe glisten with silver and azure. It is

around the black rocks which border the tropical seas that the fish called the captain is caught. Though his colors vary with the latitude, it is sufficient, in order to afford an idea of his beauty, to introduce the description given of him by Francois Cauche,* of a species which is found on the coast of Madgascar. He says that this fish, which delights to live among rocks, is striped in the form of lozenges, that his scales are of the color of pale gold, that his back is varnished over with black, inclining in several places to vermillion. His dorsal fin and his tail are waved with azure, which fades away to green towards the extremities. At the foot of the same rocks is likewise found the magnificent fish, called by the Brasilians *accara pinima*, of which Marcgrave has given a figure in the sixth chapter of his fourth book. This beautiful fish has scales both of a gold and silver hue, traversed from head to tail by black lines, which admirably heighten their their brilliancy. The same author likewise describes several species of moon-fish, that frequent the same places. For my own part, I amused myself on the rocks of the Island of Ascension with observing, for whole hours, the moon-fish, sporting amid the tumultuous waves, which are incessantly breaking against them. These fish, of which there are various species, have the circular, and sometimes broken form of the orb of night, whose name they bear Like her too, they are of the color of polished silver. They seem destined to deceive the fisherman in every possible way; for their bellies are streaked with black stripes in the form of lozenges, which gives them the appearance of being caught in a net; they seem every moment on the point of being thrown upon the shore by the agitation of the billows in which they play; their mouths are besides so small, that they frequently nibble away the bait without touching the hook; and their skin, which is without scales, is so hard, that the trident, even though its prongs

* See his account of Madagascar.

be ever so keenly whetted, frequently fails to penetrate it. François Cauche even says that you cannot, without great exertion, make an incision in their skin with the sharpest knife. It is on the same shores of Ascension that we find the lamprey, a species of eel of the rocks, which is excellent eating, and whose skin is besprinkled with flowers of gold. It may be generally affirmed that every rock of the sea is frequented by a multitude of fishes of the most brilliant colors, such as the gilt-head, the parroquet, the zebra, the roach, and a multitude of others, the very classes of which are unknown to us. The more numerous are the shallows and the rocks of a sea, the more varied likewise are the species of saxatile fishes by which it is inhabited. For this reason the Maldivia Islands, of which there is such a number, alone furnish a prodigious multitude of fishes, of very different colors and forms, with most of which our ichthyologists are yet unacquainted.

As often, therefore, as you see a brilliant fish, you may be assured that his habitation is near the shore; and, on the contrary, that he lives out in the ocean if he be of a dull color. The truth of this we may ascertain even by our rivers. The silver smelt and the blay, whose scales are used for making false pearls, sport on the strand of the Seine; while the eel, of a dusky slate color, delights to be in the middle, and at the bottom of its bed. These laws must not, however, be too much generalized; Nature, as we have observed, adapts them all to the beings she has created, and to the gratification of man. Thus, for example, though the fishes on the shores have, in general, brilliant colors, yet many species of them are invariably of a dark hue. Such are not only those which are bad swimmers, as the sole, the turbot, &c. but those which inhabit some parts of the shores, whose colors are lively. Thus the tortoise, that feeds at the bottom of the sea, or on green herbs, or crawls by night over the white sands, to deposit her eggs, is of a dark color: thus the sea-cow, which enters into the channels of the American rivers, and pastures,

without leaving the water, on the green herbage of their shores, forms a contrast to its verdure by the brown color of her skin.

The saxatile fishes, which can easily find security among the rocks by their agility in swimming, or by the facility of finding retreats in their cavernous receptacles, or of there defending themselves by their armour against their enemies, have all lively and brilliant colors, the cartilaginous excepted: such are the blood colored crabs, the azure and purple lobsters; among others, that to which Rondelet has given the name of Thetis, on account of its beauty; the violet-colored urchins, armed with spears and points, the nerits, drawn out into grey and rose-colored ribbons, and a multitude of others. It is very remarkable that all shell-fish, which move about and migrate, and consequently possess the power of choosing their abodes, are those of their kind that have the richest colors; such are the nerits, which I have just mentioned, the venus-shell, resembling polished marble, the olive tinged, like velvet, with three or four colors, the harp, adorned with the rich tints of the most beautiful tulips, the tonne speckled like the partridge's wing, which walks beneath the shade of madrepores, and all the families of univalves that seek security by burying themselves in the sand. The bivalves, such as the ducal mantle, of a scarlet and orange-color, and a multitude of migratory shell-fish, are impressed with the most lively colors, and form, with the different grounds of the sea, secondary harmonies totally unknown. But those which remain stationary, like most of the oysters of the South Seas, which even frequently adhere to the rocks; or those that are perpetually at anchor on the same spot, as the muscle and the *pinna marina*, moored by threads to a pebble; or such as repose on the bosom of the madrepores, like vessels on the stocks, as the Noah's ark; or those that are entirely buried in the bosom of calcareous rocks, as the dail of the Mediterranean; or those which, motionless with their own weight, sometimes exceeding several hundred

pounds, pave the surface of the shoals, as the *tuilée* of the Moluccas; and the large univalves, as the rock, the burgos, &c. or, lastly, those which, I believe, are blind, like our land-snails, such as the limpet, which, forming a vacuum, fixes itself to the polished surface of the rocks; are of the color of the ground they inhabit, in order that they may be less easily perceived by their enemies.

It is farther highly worthy of observation, that though several of these sedantry shell-fish are enclosed with brown and shaggy cases, as those that are called cornets and rollers, or with a black pellicle of the color of the stones, to which they fasten themselves, as the muscles of Magellan, or encompassed with a mud-colored tartar, as the limpet and the burgos, they have, beneath their dusky exterior coats, nacres and tints, which frequently surpass, in beauty, those of the shell-fish whose apparent colors are the most brilliant. Thus the Magellanic limpet, when divested of its tartar by means of vinegar, presents the richest of cups, tinged with the colors of the most beautiful tortoise-shell, and blended with burnished gold, glowing beneath a radiant varnish. The large Magellanic muscle conceals, in like manner, beneath a black coat, the tints of aurora. It is impossible to ascribe, as in the shell-fish of India, colors so enchanting to the action of the sun on these shell-fish, covered with coats of tartar, and living besides, in a foggy climate, consigned, for a great portion of the year, to the gloom of winter and the blast of tempests. We might venture to assert, that Nature has veiled their beauty to preserve it for man; and that she has stationed them on shores, where the sea cleanses by tossing about, only to place them within his reach. Thus by an admirable contrast, she has assigned a place to the most brilliant shells in regions the most exposed to the fury of the elements; and by another contrast no less astonishing, she presents to the poor Patagonians spoons and goblets, whose lustre surpasses, beyond dispute, the richest plate of civilized nations.

Hence may be inferred, that fish in general, which have two opposite colors, live on two different grounds, as we have observed with regard to birds, and that those which have but one color frequent only one ground. I recollect that, in making the tour of the Isle of France on foot, along the shore of the sea, I found nerits with an ash grey ground and red ribbons, sometimes on brown rocks, sometimes on madrepores, white, like peach-blossom. They formed a highly pleasing contrast, and appeared at the bottom of the water, on the marine plants, like their fruit. I likewise found venus-shells perfectly white, with a rose-colored mouth, and swelled out like eggs, after which they are sometimes named; but it is now impossible for me to say whether they adhered to the brown rocks or to the white madrepores. There are also found on the coasts of Normandy, in the district of Caux, two species of rocks, one of white marl, detached from the cliffs, the other of black flint, amalgamated with them. Now I never saw, in general, more than two species of periwinkles; the one very common, and quite black, which is used as food, and the other, which is white, and has a mouth tinged with red. I cannot pretend to say whether the white periwinkles attach themselves to the white rocks, and the black periwinkles to the black rocks, or whether the reverse is the fact, because I did not make the observation; but whether they form with those rocks consonances or contrasts, it is very remarkable, that as there are but two species of rocks, so there are only two species of periwinkles. I am inclined to believe that the black periwinkles adhere, in preference, to the black rocks; for I have remarked that at the Isle of France there are neither black periwinkles nor black muscles, because there are not, in the sea which surrounds it, any rocks precisely of that color; and I am certain that muscles are always of the color of the ground on which they live: those of the Isle of France are brown. It must not be concluded, on the other hand, that these shell-fish derive their tints from the rocks to

which they adhere; for it would follow that the rocks of the strait of Magellan, which produce muscles and limpets embellished with such rich colors, are themselves inlaid with mother-of-pearl, opal, and amethyst: besides, every rock maintains shell-fish of very different colors. At the foot of the rocks of the district of Caux, loaded with black periwinkles, you find azure lobsters, crabs, marbled with red and brown, legions of dark blue muscles, with limpets of an ash grey. All these shell-fish, when alive, form the most agreeable harmonies with a multitude of marine plants with which those white and black rocks are hung, by their tints, purple, grey, rust-colored, brown and green, by the variety of their forms and aggregations, resembling oak-leaves, tufts, garlands, festoons, and long cords, agitated by the waves in every possible manner. In truth, no painter could compose such groups, let him give to his imagination what scope he pleases. Many of these marine harmonies escaped me, for, at that time, I considered them as the effects of chance. I looked at them, I admired them, but I neglected to observe them: however, even then, I suspected that the pleasure excited by their combination was to be referred to some law, with which I was unacquainted.

I have said sufficient on this subject to shew how much naturalists have mutilated the fairest portion of natural history, by giving, as they generally do, detached descriptions of animals and plants, without mentioning the season when, and the place where they are to be found. By this negligence they have stripped them of all their beauty; for there is not an animal or a plant, whose harmonic point is not fixed at a certain situation, at a certain hour of the day or of the night, at the rising or setting of the sun, at the phases of the moon, nay, even in tempests, exclusive of the other contrasts and concordances resulting from these.

I am so thoroughly persuaded of the existence of all these harmonies, that I have not the slightest doubt but

that, on seeing the color of the animal, we might nearly ascertain that of the ground on which it lives; and that by following these indications, we might be led to very curious discoveries. We have not, for example, yet found on any shore the *cornu ammonis*, a fossil so common, and of a size so considerable in our quarries. In my opinion we ought to look for this dusky shell in places abounding with marine plants, such as those that afford pasturage to the turtle. I do not think that any attempt has yet been made to drag such bottoms, on account of the multitude of marine plants which grow in them, and because they are frequently very deep, and at a great distance from any coast: such are those off the Cape de Verd, or, according to others, towards Florida, and which, at certain seasons, yield such a quantity of floating herbage, that the ocean is covered with it for the space of thirty or forty leagues, so that ships can scarcely force their way through. If the most brilliant shells are found on dark grounds, dusky shells ought to be met with on green grounds.

These contrasts are even found in the coarse soils of the earth, as I could clearly demonstrate, did time permit. Of this we may convince ourselves by the following simple argument. If a uniform and mechanical cause had produced the globe of the earth, it must have been throughout of the same substance, and of the same color; the hills, the mountains, the rocks, the sands, must have been amalgamations, or wrecks of each other; but this is not the case in any one district, however small its extent. In general, as we have observed, the soil is light-colored towards the north, and dark towards the south, in order to reflect the heat in the first case, and to absorb it in the second; but notwithstanding these general dispositions, you find in every particular spot the greatest variety. In the same canton you meet with red mountains, black rocks, white earths, and yellow sands. Their substance is as much varied as their color; there are granites, calcareous stones, gypsum or plaster, and vitrifiable sands. In the Isle of

France the rocks of the mountains are blackish, the soils of the vallies red, and the sands of the shores white. The rocks there are vitrifiable, and the sands calcareous. When I was in that island, an adventurer attempted to establish a glass manufactory; but the result of his operations was the very reverse of what he had expected. Having set fire to his furnace with great pomp and ceremony, the sand, of which he purposed to make glass, was converted into lime, and the stones of his furnace were vitrified. Though white earths are rarely seen between the tropics, yet white sands are common on the shores. It is certain that this color, from its lustre and refraction on the horizon, renders low shores perceptible at a great distance, as has been justly remarked by John Hugo de Linschoten, who would have been shipwrecked many times, had it not been for these sentinels, placed by Nature on most of the low and dusky coasts of India. On the shore of the Pays de Caux the sands are grey, but the cliffs are white: besides this, they are crossed horizontally by black stripes of pebbles, which form contrasts very perceptible at a great distance.

There are some places where we find white rocks and red earth, as in mill-stone quarries: hence result very agreeable effects, especially with their natural accessaries of vegetables and of animals. I should digress too far were I to enter into any details on this subject: it is sufficient for me to recommend to naturalists to study Nature in the same manner as the great painters, that is, by uniting the harmonies of the three kingdoms. Every one who shall thus observe her, will find a new light diffused over the perusal of Travels and of Natural History, though their authors scarcely ever speak of these contrasts but by accident and unintentionally. But every one will be able of himself to discover their ravishing effects in what is denominated brute Nature, I mean that with which the hand of man has never meddled. An infallible method of distinguishing them is this: whenever any object in

Nature conveys a sensation of pleasure, you may be assured that it affords some harmonic concert.

Undoubtedly the animals and the plants of the same climate have not received of the sun or of the elements liveries so varied and so characteristic. A thousand new observations may be made on their contrasts. He who has not seen them in their natural state, is unacquainted with their beauty, or their deformity. They are not only in opposition to the grounds of their respective habitations, but likewise with each other, genus with genus; and it is worthy of remark, that when these contrasts are established, they exist in all the parts of the two individuals. We shall say something of those of the plants in the following study, merely skimming that delightful and inexhaustible subject. Those of animals are still more extensive; they are opposed not only in forms and in gestures, but likewise in instincts; and with differences so marked they love to associate with each other in the same places. It is this consonance of tastes, which, as I have observed, distinguishes beings that are in contrast, from those that are contrary, or enemies. Thus the bee and the butterfly extract nectar from the same flowers; the single-hoofed horse, with his flowing mane, snuffing the wind, loves to amble gracefully in the same meadows on which the ponderous bull impresses his cloven foot; the dull and patient ass takes pleasure in climbing the rocks on which bounds the nimble and capricious goat; the cat and the dog peacefully repose by the same fire-side, when the tyranny of man has not vitiated their dispositions by treatment calculated to excite hatred and jealousy between them. In a word, contrasts exist not only in the works of Nature in general, but in each individual in particular, and constitute, as well as the consonances, the organization of bodies. If you examine one of these bodies, of whatever species it may be, you will remark in it forms absolutely opposite, and nevertheless consonant. It is thus, that, in animals, the excretory organs are contrasted with those of nutrition

The long tails of the horse and of the bull, are opposed to the large size of their heads and of their necks, and make amends for the motions of these anterior parts, which are too heavy to drive away the insects from their bodies. On the contrary, the broad tail of the peacock forms a contrast with the length of the neck and the smallness of the head of that magnificent bird. The proportions of other animals exhibit oppositions not less harmonious, nor less adapted to the necessities of each species.*

* This law of contrasts is, in my opinion, a delightful source of observations and of discoveries. The women, I repeat it, always nearer to Nature than we are, employ it continually in the colors of which they compose their dress, though no naturalist that I know of has observed that Nature herself employs it in the harmony of all her works. Of this we may convince ourselves without stirring beyond our own thresholds. For example, though there is among dogs an extraordinary variety of colors, yet no person ever saw one red, green, or blue; but they are in general of two opposite hues, one light and the other dark, that, in whatever part of the house they are, they may be distinguished from the furniture, with the colors of which they would else frequently be confounded. But though the colors of these animals partake, like those of most quadrupeds, of the two extreme terms in the progression of colors, that is, black and white, I do not recollect to have ever seen a dog completely white, or completely black. White dogs have always some spots on their skins, were it only the tip of the snout, of a black color. Those that are black, or brown, have white breasts, or fire-colored spots, so that, wherever they are, they may be easily seen. I have farther remarked in them this instinct, especially in dogs of a dark color, that when they went to lie down, they always go to a white-colored stuff in preference to any other color. The ladies have frequently opportunities of knowing this by experience; for if a little dog of a dark color happens to be in the room with them, he never fails to lie down at their feet, and on their petticoats. The instinct which prompts the dog to seek repose on white stuffs, proceeds from the sense which he himself has, of the contrast affected by the fleas, by which he is frequently tormented. Fleas invariably resort to white objects. If you enter a place, where there are many of those insects, with white stockings, they will soon be covered with them. They will even crowd to a piece of white paper. For this reason white dogs are much more infested with them than others. I have accordingly observed, that wherever there are dogs of this color, the black and the brown pay court to them, and prefer them for playmates, undoubtedly to get rid of the fleas at their expence. By this I mean not, however, to throw the imputation of treachery on their friendship. Were it not for the instinct of these black, nimble, and nocturnal insects, which causes to prefer the white color, it would be impossible to perceive and to catch them. The common fly, itself darkcolored, resorts, in like manner, to white and brilliant objects; and this is the reason why it tarnishes all the glasses and gilding in our apartments. The flesh-fly, on the contrary, loves to settle on the livid colors of meat approaching to putridity. His blue corslet makes

Harmonies, consonances, progressions, and contrasts must therefore be reckoned among the first elements of Nature. To these we are indebted for the sentiments of order, of beauty, and of pleasure, which spring up within us at the sight of her works; as it is from their absence that those of disorder, ugliness, and disgust arise. They extend alike to all the kingdoms; and though I have confined myself in the remainder of this work to the examination of their effects in the vegetable kingdom alone, I cannot, however, resist the pleasure of pointing them out, at least in the human figure. It is here that Nature has collected all the harmonic expressions by way of eminence. I shall attempt to trace a feeble sketch of it. This is not, I admit, the proper place for it, and I have not leisure to

him easily discernible on that ground. If we extend these contrasts farther, we shall find, that not only all sanguivorous insects have the instinct of opposing their colors to those of the situations in which they live, but likewise all carnivorous animals; whereas all feeble, gentle, and innocent animals, as we have already seen, are furnished with means and instincts conformable to the grounds they inhabit. Such was the will of Nature, in order that the former might be perceived by their enemies, and that the latter might be enabled to escape them.

From these natural laws may be deduced a multitude of useful and agreeable consequences, tending to the improvement of our habitations in cleanliness and convenience. For example, in order the more readily to destroy the insects that disturb our slumbers, and which are so common in great cities, it would be advisable to have the alcoves, the hangings of the beds, and the bedsteads either white or light-colored: the insects would then be easily perceived. As to convenience, every one must be sensible of the necessity of contrasting the colors of our different pieces of furniture, that we may distinguish them with facility from each other. I am frequently at a loss, for instance, to know what has become of my snuff-box, because it is black, like the table on which I lay it down. If Nature had not possessed more intelligence than I, most of her works would be imperceptible to us. It is very astonishing that philosophers, who have made such curious researches into the nature of colors, have been silent with respect to their contrasts, without which nothing would be distinguishable, or rather, their forgetfulness is not surprising: a man is incessantly pursuing the illusions which escape him, and neglects the useful truth which lies at his feet.

The harmonies of colors have, besides, a powerful influence on the passions? but I have nothing to say on that subject in a country where the women employ them with such unbounded sway; it is to the women that I am indebted for the first idea I had of studying the elements of the laws by which Nature herself endeavors to please us.

arrange more than a part of the observations which I have collected on this vast and interesting subject; but the little I shall say will be sufficient to overturn the opinion advanced by men of too high celebrity among us, I mean, that human beauty is arbitrary. I even venture to flatter myself that these crude essays may induce wise men, who love Nature, and who seek to make themselves acquainted with her laws, to dig into the recesses of this vast mountain, in which truth is buried. Their manifold knowledge will guide them, without difficulty, through the whole extent of that mine, of which, like a blind man, I have merely begun to work the first veins. They will conduct him to richer ore, since even I, (if I may be allowed the simile) at the bottom of a valley and among the sands of a petty stream, have been able to pick up for my portion a few straggling grains of gold.

OF THE HUMAN FIGURE.

All the harmonic expressions are combined in the human figure. In this article I shall confine myself to the examination of some of those that enter into the composition of the head of man. Observe, in the first place, that its form approaches the spherical, which, as we have already seen, is the form by pre-eminence. I believe that the head of no animal has this configuration in common with it. On the anterior part is traced the oval of the face, terminated by the triangle of the nose, and surrounded with radiated portions of the hair. The head is, besides, supported by a neck which has a much smaller diameter than itself, and which detaches it from the body by the concavity it thus forms.

This slight sketch presents to us, in the first instance, the five harmonic terms of the elementary generation of forms. The line is exhibited by the hair, the triangle by the nose, the sphere by the head, the oval by the face and the parabola by the vacancy below the chin. The

neck, which, like a column, supports the head, also exhibits another very pleasing form, that of a cylinder, composed of a circle and a quadrilateral figure.

These forms are not traced in a dry, geometrical manner, but they partake one of the other, by mutual amalgamation, as parts of a whole ought to do. Accordingly the hair is not straight as a line, but harmonizes by means of its curls with the oval of the face. The triangle of the nose is neither acute nor right-angled, but by the undulating swelling of the nostrils it agrees with the heart form of the mouth, and diminishing towards the forehead, it unites with the cavities of the eyes. The spheriod of the head is, in like manner, amalgamated with the oval of the face. The same is the case with the other parts, Nature having employed, for the purpose of joining them together, the rounded form of the forehead, the cheeks, the chin, the neck, that is, portions of the most beautiful of all harmonic expressions which is the sphere.

There are several other remarkable proportions, which form among themselves very agreeable harmonies and contrasts; such as that of the forehead, which presents a quadrilateral figure in opposition to the triangle formed by the eyes and the mouth, and that of the ears, formed of the most ingenious acoustic curves, which are not found in the auditory organ of animals, because it is not destined, like that of man, to receive all the modulations of speech. But I shall confine myself to the charming forms which Nature has given to the mouth and the eyes, which she has rendered the most striking, because they are the two active organs of the soul. The mouth is composed of two lips, of which the upper is moulded into the form of a heart, and the latter is rounded into a portion of a semicylinder. Between the lips are discovered the quadrilateral figures of the teeth, whose perpendicular and parallel lines are most agreeably contrasted with the round forms contiguous to them, and the more so, since, as we have already seen, from the junction of the first generative

term to the harmonic term by excellence, that is, of the straight line to the spherical form, results the most harmonious of contrasts. The same conformities are found in the eyes, the forms of which approach still nearer to the elementary harmonic expressions, as ought to be the case with regard to the principal organ. They are two globes, bordered with eye-lids, emitting rays like pencil strokes, which form with them a delightful contrast, and exhibit a wonderful consonance with the sun, from which they seem to have been modelled, being, like that luminary, of a round figure, having diverging rays in their lashes, a rotary motion round themselves, and possessing like the orb of day, the power of shrouding themselves in clouds by means of their lids.

The same elementary harmonies exist in the colors of the head, as in its forms; for in the face, the teeth and the eyes are of a pure white; then there are tints of yellow which mingle with its carnation, as is well known to painters, and in the next place red, the color by way of eminence, which appears in the lips and on the cheeks. You remark, besides, the blue color of the veins, and sometimes of the pupil of the eye, and, lastly, the black of the hair, which, by its opposition, sets off the colors of the face, as the vacancy of the neck distinguishes the forms of the head.

It will be observed that, in this portion of the human frame, Nature never employs colors that form harsh contrasts, but causes them, like the forms, to mingle with each other. Thus the white of the face is here shaded away into yellow, and there into red. The blue of the veins inclines to green. The hair, in general, is not of a jet black, but brown, chesnut, flaxen, and commonly of a color, into which enters a shade of the carnation hue, that the opposition may not be too harsh. It must farther be remarked, that as she employs portions of a sphere to form the muscles which join its organs together, and more particularly to distinguish these same organs, she makes use of red for the same purposes. She has accordingly

spread over the forehead a tint of this color, which she has heightened on the cheeks, and has applied perfectly pure to the mouth, the organ of the heart, where it forms an agreeable contrast with the whiteness of the teeth. The union of this color, and of this harmonic form, is the strongest consonance of beauty; and it may be remarked, that wherever the spherical forms are most prominent, there the red color is the deepest, excepting in the eyes.

As the eyes are the principal organs of the soul, they are intended to express all its passions; this they could not have done with the harmonic red tint, which would have given only one single expression. To enable them to express contrary passions, Nature has combined in them the two most opposite colors, the white of the orbit and the black of the iris. and sometimes of the pupil, which form a very harsh opposition when the globes of the eyes are expanded in their whole diameter; but by means of the eye-lids, which man contracts or dilates at pleasure, he gives them the expression of all the passions from love to fury. The eyes, the pupils of which are blue, are naturally the mildest, because their opposition with the adjoining white is less clashing; but in anger they are the most terrible, from a moral contrast, which causes us to look upon those objects as the most dangerous, which threaten evil after having first inspired the hope of good. Those, therefore, who have such eyes, should pay great attention not to belie that character of benevolence conferred upon them by Nature, for blue eyes convey, in their color, a certain heavenly expression which I am incapable of describing.

With respect to the motion of the muscles of the face they are extremely difficult to describe, though I am persuaded of the possibility of explaining their laws. Should any person attempt this, he must necessarily refer them to moral affections. Those of joy are horizontal, as if, in felicity, the soul were desirous of expending itself Those of grief are perpendicular, as if, in calamity, it also

sought a refuge in heaven or in the bosom of the earth. It is likewise, necessary to take into the account the alterations of the colors and the contractions of the forms, and we shall be convinced at least of the truth of the principle which we have laid down, that the expression of pleasure consists in the harmony of the contraries which are blended one with another, in colors, forms and movements; and that the expression of pain consists in the violence of their oppositions. The eyes alone have movements inexpressible, and it is remarkable, that in excessive emotion they are covered with tears, and seem from this circumstance, to have still farther analogy with the orb of day which in tempests, shrouds himself in rainy clouds.

The principal organs of the senses, which are four in number in the head, have particular contrasts, which distinguish their spherical forms by radiated figures and their bright colors by dusky tints. Thus the brilliant organ of sight is in contrast with the eye-lashes, those of smell and taste with the mustachios, that of hearing with the portion of the hair which is denominated whiskers, and separates the ears from the face; and the face itself is distinguished from the rest of the head by the beard and the hair.

We shall not here examine the other proportions of the human figure in the cylindrical form of the neck, opposed to the spheroid of the head and the plane surface of the breast; the hemispherical forms of the bosom which form a contrast with the latter, as do the cylindrical pyramids of the arms and fingers with the shoulder-blades; nor the consonances of the fingers with the arms by three similar articulations, nor a multitude of other curves and harmonies, which have not even a name in any language, though they are in every country the all-powerful expression of beauty. The human body is the only one that combines the most agreeable modulations and concerts of the five elementary forms, and the five primordial colors, without exhibiting the harsh and rude oppositions of animals, such as the points of the hedgehog, the horns of the bull, the tusks of

the boar, the claws of the lion, the marbled coat of the dog, and the livid colors of venomous reptiles. It is the one whose real figure may be perceived without disguise; the other animals being clothed with hair, feathers, or scales, which conceal their members and cover their skin. Man is, farther, the only animal, which, in his perpendicular attitude exhibits all his senses at once to the view, for you can scarcely perceive more than one half of a quadruped, of a bird, of a fish, in the horizontal position which is peculiar to them, because the upper parts of their bodies conceals the lower. We shall likewise remark that the gait of man has neither the unequal bounds nor the slowness which mark the progression of most quadrupeds, nor the rapidity of that of birds; but it is the result of the most harmonious movements, as his figure is of the most agreeable forms and colors.*

* Distinguished writers have asserted that the negroes esteem their color more beautiful than that of the whites, but the reverse is the fact. During my residence in the Isle of France, I questioned the blacks who were in my service, on this subject: they were in the habit of speaking to me with sufficient freedom to tell me their sentiments, especially on a subject so indifferent to slaves as the beauty of the whites. I sometimes asked them which they liked best a black woman or a white one: they never hesitated to assign the preference to the former. I even once saw a Negro who had been dreadfully cut with a whip, rejoicing that the scars of his wounds turned white, because he hoped that, by these means he should cease to be a Negro. The wretched man would have suffered himself to be flayed alive, in order to become white. This preference it will be said, is, in this case the effect of the superiority which they observe in Europeans. But the tyranny of their masters ought to make them detest their color. Besides, the blacks of our colonies, both male and female, evince the same partiality as our peasants for lively and glaring colors. Their supreme luxury is to wrap their heads in a red handkerchief. Nature has not given to the rose of Africa a different hue from that of Europe.

If the judgment of black slaves on this subject cannot be relied on, we might adduce that of the sovereigns of their countries, who have no interest in dissembling their inclinations. They acknowledged that, in this respect, as in many others, Nature has been much less favorable to them than to the Europeans. African sovereigns have frequently applied to the chief officers of the English, Dutch and French factories, for white women, promising to grant them in return considerable privileges. Lamb, an English factor at Ardra, being taken prisoner by the king of Dahomy, informed the governor of the English fort of Juida, in 1724, that if he could send that prince any white woman, or only a mulatto, she would acquire absolute power

The most agreeable are the multiplied consonances of the human figure, the most displeasing are its discordances.

over his mind. Another sovereign in a different part of the African coast, one day promised a Capuchin missionary who was preaching the gospel to him, to dismiss his seraglio and to become a christian if he would procure him a white woman for his wife. The zealous missionary immediately repaired to the nearest Portuguese settlement, and on enquiring for some poor and virtuous female, he was directed to the niece of a gentleman, in very indigent circumstances, and who lived in the most profound retirement. He waited one Sunday morning at the door of the church, till she came out from mass with her uncle; and addressing the latter before the whole congregation, he summoned him in the name of God and for the sake of religion to give his niece in marriage to the negro king. The gentleman and his niece having consented to the match, the black prince married her after previously sending away all his women, and causing himself to be baptized.

The most intelligent historians relate several instances of this kind of preference in the black sovereigns of Africa and the south of Asia. Thomas Roe, ambassador from England to the Mogul Selim Shah, relates, that this powerful monarch treated the Portuguese Jesuists, missionaries at his court, with great distinction, in the hope of procuring some of their country-women for his seraglio. He, at first, loaded them with privileges, assigned them habitations in the vicinity of his palace, and admitted them to his familiarity; but when he perceived that the fathers were by no means inclined to minister to his passions, he employed a very cunning artifice to oblige them. He declared that he was desirous of embracing christianity and pretended he was restrained only by political reasons, he ordered two of his nephews diligently to attend the instructions of the missionaries. When they had made a sufficient progress, he enjoined them to solicit baptism, after the performance of which rite, he thus addressed them: "You cannot now marry pagan women of this country, because you are Christians; the fathers who have baptised you, must find you wives. Tell them to send for some Portuguese women for that purpose." The young men did not fail to make this demand of the Jesuists, who suspecting that the Mogul wished to see his nephews married to Portuguese women, only that he might have some white females in his seraglio, refused to have any concern with this negotiation. Their refusal drew down upon them endless persecutions from Selim Sheh, whose first step was to cause his nephews to renounce Christianity.

The black color of the skin is, as we shall soon percieve, a blessing of heaven conferred on the southern nations, because it suppresses the reflection of the burning sun beneath which they live. These people, nevertheless, think white women more beautiful than black, from the same reason which causes them to look upon day as more beautiful than night, because the harmonies of the colors and lights are perceptible in the hue of the whites, whereas they disappear almost entirely in that of the blacks, who cannot sustain any comparison with them in point of beauty excepting in shape and figure.

The proportions of the human figure, which as we have seen, were borrowed from the most beautiful forms of Nature, have in their turn become models of beauty for man. If we pay any attention, we shall find that the forms which please us most in the arts

For this reason nothing on earth is more beautiful than a handsome man, and nothing more disagreeable than a very ugly person.

This is likewise the reason why it will always be impossible for art to produce a perfect imitation of the human figure, on account of the difficulty of combining all its harmonies, and what is a still greater, of making those which are of a different nature concur with each other. Painting, for example, expresses the colors of the face, and sculpture with great accuracy imitates its form; but if you attempt to combine the harmony of colors and of forms in a single bust, the work will be much inferior to a simple piece of painting or sculpture, because it will exhibit particular dissonances of colors and of forms, and their general dissonance which is still more strongly marked. If you should farther endeavour to unite in it the harmonies of motion as in automatons, the discordance would only be increased, and by making it speak, you would a fourth disconsonance which would excite horror. The intellectual system would then clash with the physical system. Accordingly, I am not astonished that St. Thomas Aquinas was so shocked at the speaking head which his master Albert the Great had spent many years in making, that he instantly dashed it to pieces. It must have produced in him the same impression as an articulate voice issuing from a dead body. Productions of this kind, in general, do great honor to an artist; but they demonstrate the imbecility of his art, which deviates the farther from Nature, the more it strives to combine several of her harmonies: instead of blending them as she does, its efforts tend only to place them in opposition.

All these observations evince the truth of the principle we have laid down, which is, that harmony proceeds from

as those of antique vases, and the proportions of length and breadth in monuments were taken from the human figure. It is well known that the Ionic column with its capital and its channeling was an imitation of the figure, the head-dress and robe of the Grecian ladies.

.ne union of two contraries and discord from their collision, and that the more agreeable are the harmonies of any object, the more its discordances are disgusting. Such is the origin of our pleasure and displeasure, in physics, as in morals, and this is the reason why we so frequently love and hate the same object.

Many other interesting remarks might be made on the human figure, especially if we connect it with moral sensations, which alone give expression to its features. Of these we shall take some notice in the sequel of this work when we come to treat of sentiment. Be that as it may, the physical beauty of man is so striking even to animals themselves that to this cause must be principally attributed the dominion he possesses over them throughout the whole earth: the weak seek refuge under his protection, and the strong tremble at the sight of him. Mathiole relates that the lark flies for shelter among multitudes of men, when she perceives a bird of prey. This instinct was farther attested to me by an officer who one day saw one of these birds under similar circumstances take refuge among a very distinguished squadron of cavalry in which he then served; but one of his comrades with whom the little stranger sought an asylum, rode over and trampled her to death, which barbarous action justly drew upon him the hatred of the most honorable portion of his corps. For my own part, I have beheld a stag closely pursued by a pack of hounds, demanding with a plaintive voice the compassion of the passenger, as Pliny informs us that he will: I have myself witnessed the circumstance, in the Isle of France, as described in the Narrative of my voyage which I have given to the public. In poultry-yards where turkey-hens are kept, I have seen those birds, when under the influence of love, throw themselves with piteous cries at the feet of the peasants. If more frequent instances of the confidence of animals are not observed, the reason is because we frighten them in our fields by the report of fire-arms and by continual persecutions. We know with

what familiarity the monkies and the birds approach travellers in the forests of India. At the Cape of Good Hope, in Cape Town itself, I have seen the shores of the sea covered with marine birds reposing on the craft, and a large wild pelican playing near the custom-house with a great dog whose head he took into his wide bill. This sight inspired me immediately on my arrival, with the most favorable prepossession of the happiness of the country and the humanity of the inhabitants: and I was not mistaken. Dangerous animals, on the contrary are seized with terror at the sight of man, unless extreme necessity compel them to forego their native disposition. The elephant suffers himself to be led in Asia by a little child. The African lion withdraws roaring from the hut of the Hottentot, and seeks to establish his dominion among the forests and rocks unknown to man. The immense whale in the midst of his element, trembles and flees from the little canoe of the Laplander. Thus is fulfilled that law of the Almighty which preserved the supreme dominion to man amid all his calamities: "And the fear of you and the dread of you shall be upon every beast of the earth, and upon every fowl of the air, upon all that moveth upon the earth, and upon all the fishes of the sea: into your hand are they delivered.*

It is exceedingly remarkable that there is not in Nature either animal, plant, fossil, or even globe, which has not its consonance and its contrast out of itself, excepting man; no visible being is admitted to his society unless as his servant or his slave.

Among human proportions must undoubtedly be reckoned that law so common and yet so wonderful, by which females are produced in equal numbers with males. If chance presided over the procreation as it does over the marriages of men, we should one year see none but male children, and the next none but females brought into the world. Some nations would be composed entirely of men

* Genesis chap. ix. v. 2.

and others of women: but the fact is, that all over the earth the two sexes are produced at the same time in equal number. A consonance so regular evidently demonstrates, that a Providence watches over human societies, notwithstanding the disorders of their police. It may be considered as a testimony of the truth in favor of our religion which confines man, in marriage, to one wife, and which from this conformity to the laws of Nature, peculiar to itself, appears to have emanated exclusively from the author of Nature. Hence we may conclude, on the contrary that the religions which permit the plurality of wives are erroneous.

Ah! how little those who have sought in the union of the sexes nothing but sensual pleasures, know of the laws of Nature! They have gathered only the flowers of life without having tasted its fruits. The fair sex, say our men of pleasure: they are acquainted with women by no other name. But the sex is only fair to those who have nothing but eyes. To those who possess a heart it is likewise the generative sex, which, at the hazard of life, carries man nine months in its womb, and the nutritive sex which suckles and takes care of him in infancy. It is the pious sex which carries him in childhood to the altars of God, and with its milk inspires him with the love of a religion, which the cruel policy of man would often render odious to him. It is the pacific sex, which sheds not the blood of its fellow-creatures; the consolatory sex which attends the sick and handles without hurting them. Man may boast of his power and his strength; if his nervous hand wield the sword, that of woman, more dexterous and more useful, is skilled in the art of spinning flax and the fleece of the sheep. One seeks to vanquish care and sorrow by the maxims of philosophy, the other removes them by carelessness and mirth. One struggles against external calamities with the force of his reason, the other, more happy, escapes them by the versatility of her genius. If the former sometimes seeks glory in confronting danger

in battle, the latter triumphs in awaiting more certain and frequently more trying perils in bed and beneath the canopy of pleasure. They were, therefore, created, in order to endure together the evils of life, and to form by their union the strongest of consonances and the most pleasing of contrasts.

I am obliged by the plan of my work to proceed and to abstain from reflections on subjects so interesting as marriage and the beauty of man and woman. I shall, however, introduce a few observations extracted from my materials, for the purpose of inspiring others with a desire of exploring this rich mine, and, which is, in some measure, perfectly new.

All the philosophers who have made man their study, have justly considered him as the most wretched of all animals. Most of them have been convinced that he required a companion to supply his wants, and have placed a portion of his happiness in friendship, which is an evident demonstration of human weakness and misery; for if man were naturally strong, he would have no occasion either for assistance, or for a companion. The elephant and the lion lead a solitary life in the forests. They have no need of friends because they are strong. It is very remarkable that the ancients, in describing a perfect friendship, confined it to two persons, and never divided it among more, notwithstanding the weakness of man which frequently requires that so many of his fellow-creatures should concur in his happiness. There are several reasons for this restriction, the principal of which proceed from the nature of the human heart, which from its very weakness, is capable of embracing only one object at a time, and which being composed of opposite passions, that are incessantly balancing each other, is, in some measure active and passive, and requires to love and to be loved, to console and to be consoled, to honor and to be honored. Accordingly all the celebrated friendships in the world existed only between two persons; such were those of Castor and

Pollux, Theseus and Pyrithous, Hercules and Hylas, Orestes and Pylades, Alexander and Hephæstice. We shall farther observe that these extraordinary friendships have always been associated with virtuous and heroic actions; but whenever they were divided among several persons, they were the source of discord, and were famous only for the calamities they inflicted on mankind: such was that of the triumvirate among the Romans. When the associates in these alliances are more numerous, the mischiefs they occasion are in proportion to their number. Thus the tyranny of the decemvirs at Rome was of a more cruel character than that of the triumvirs; for its atrocities were practised without passion and as it were in cold blood.

There are likewise triummillevirates and decemmillevirates; these are bodies. They have been justly denominated by that appellation, for they frequently choose for their centre some other object than their country, of which they ought to be only the members. They have, likewise, different views, different ambitions, different interests. They are, with respect to the rest of the citizens, inconstant, divided, without object, and often too without patriotism, what regular soldiers are to light troops. They prevent them from appearing in the avenues by which they themselves advance, and at length beat them out of those which are on their way. How many revolutions have been effected by the Strelitzes in Russia, the Pretorian guards at Rome, the Janizaries at Constantinople, and bodies still more political in other countries! Thus by a just re-action of Providence, the spirit of bodies has been as fatal to countries, as the spirit of country has itself been to mankind.

If the heart of man can embrace only a single object, what shall we think of the friendships of modern times which are so multiplied? Assuredly, if a man has thirty friends he cannot give to each of them more than a thirtieth part of his affection, or receive more from them in return. He must, therefore, necessarily deceive them, and

be deceived by them, for no person would be a friend by fractions. But to tell the truth, these friendships are real ambitions, interested and purely political relations, whose sole object is to practise mutual deception, to aggrandize themselves at the expence of society, to which they would occasion much mischief if they were more closely united, and were not balanced by others in opposition to them. Thus almost all general connections lead to intestine dissensions. On the other hand I shall say nothing concerning the inconveniences resulting from the too intimate union of individuals. The most celebrated friendships of antiquity were not, in this respect, exempt from suspicion though I am persuaded that they were as virtuous as those who were the objects of them.

The author of Nature has given to each of us in our species a natural friend, capable of sharing with us all the accidents of life, of relieving all the affections of the heart, and all the inquietudes of our disposition. At the beginning of the world he said: "It is not good that man should be alone: I will make an helpmate for him." Woman pleases all our senses by her form and by her graces. In her character she possesses all that can interest the human heart at every period of life. By the long and painful attentions she bestows on our infancy, she deserves our respect as a mother and our gratitude as a nurse; afterwards in youth, our love as a mistress; in manhood our tenderness as a wife, our confidence as the manager of our domestic concerns, our protection as being weak; and in old age our regard as the mother of our offspring, our intimacy as a friend who has been our companion in prosperity and in adversity. Her very levity and caprices balance on every occasion the too sedate gravity and steadiness of man, and reciprocally acquire the preponderance over them. Thus the deficiences of one sex and the excess of the other operate as a mutual compensation. They are made, if I may venture to employ the expression, to fit into each other like pieces of wood-work, whose

projecting and retreating parts form a vessel capable of navigating the tempestuous ocean of life, and which the very action of the tempests tends only to strengthen. Did we not know, from sacred tradition, that woman was created from the body of man, and were not this great truth daily manifested by the wonderful production of children of either sex in equal numbers, we should infallibly learn it from our wants. Man without woman, and woman without man, are imperfect beings in the order o Nature. But, the greater the contrast in their characters, so much the stronger is the union of their harmonies. It is, as we have already hinted, from their opposition in talents, tastes, fortunes, that the strongest and most durable affection is produced. Marriage, therefore, is the friendship of Nature, and the only real union which is not liable, like those that exist between men, to errors, rivalships, jealousies, and the changes which time effects in our inclinations.

But why are there so few happy marriages among us? Because the sexes are unsexed. Because woman assume the manners of men by their education, and men adopt by their habits the manners of women. The masters, the sciences, the customs, the occupations of men have robbed the women of the graces and the talents of their sex. There is one infallible method of bringing them both back to Nature; that is, to inspire them with religion. By religion I mean not a love of ceremonies nor of theology, but the religion of the heart, pure, simple, unostentatious, as it is so admirably explained in the gospel.

Religion will not restore to the two sexes their moral character, but likewise their physical beauty. Neither climate, nor food, nor bodily exercise produce human beauty, but the moral sentiment of virtue which cannot exist without religion. Aliments and exercise undoubtedly contribute much to the growth and expansion of the body, but they possess no influence over the beauty of the face, which is the true physiognomy of the soul. It is not

rare to see tall, robust men disgustingly ugly, with the stature of giants and the physiognomy of monkies.

The beauty of the face is so much the expression of the harmonies of the soul, that, in every country, those classes of the citizens which are obliged by their condition to live with the others in a state of constraint are evidently the least handsome. The truth of this observation may be ascertained particularly among the nobility of several of our provinces, who live in perpetual jealousy with each other on account of their rank, and in a state of incessant warfare with the rest of the citizens for the preservation of their prerogatives. Most of them have a sallow, bilious complexion. They are meagre, sour-looking, and perceptibly more ugly than the inhabitants of the same district, though they breathe the same air, live on the same food, and possess in general a superior fortune. Thus they want a great deal of being gentlemen in name and in reality. Nay there is even a nation, whose country borders upon our own, the individuals of which are as notorious in Europe for their pride as for their ugliness. All these men become ugly from the same reason as most of our children, who, though so beautiful in their early years, grow plain by going to school, in consequence of the misery and constraints of academical institutions. I shall say nothing of their moral character, which undergoes the same revolution as their physiognomy; the latter being invariably a consequence of the former.

The same observation will not apply to the nobility of some districts of our provinces, and of those of various states of Europe. These, living in good understanding with each other, and with the rest of their countrymen, are, in general, the handsomest part of their nation, because their social and benevolent minds are not in a continual state of constraint and anxiety. To the same moral causes may be ascribed the beautiful features of the physiognomy of the Greeks and Romans, who have left us, in general, such noble models in their statues and their medals.

They were handsome because they were happy; they lived in good intelligence with their equals, and enjoyed popularity among the rest of their fellow-citizens. Besides, they had among them, no dismal institutions like those of our colleges, which disfigure at once all the youth of a nation. The present descendants of those same people are far from resembling their ancestors, though the climate of their country has undergone no alteration. To moral causes must likewise be attributed the physiognomies of the great men of the court of Louis XIV. so singularly remarkable for their dignity, as may be seen by their portraits. In general, people of quality being by their rank above the rest of their fellow-subjects, do not live incessantly at dagger's draw with each other, and with the rest of their nation, like most of our petty country-gentlemen. Besides, they are commonly educated in the paternal mansion, beneath the happy influence of domestic tuition, and far remote from external jealousy. But those of the age of Louis XIV possessed this advantage over their descendants, that they prided themselves on their benevolence and popular affability, and of being the patrons of talents and virtue wherever they found them. There is not perhaps a single great house of that time, which might not boast of having patronised and brought forward some individual from among the common people or the lowest order of the nobility, who by their means, acquired celebrity in arts, in literature, in the church, or in arms. These great men acted thus in imitation of the king, or perhaps from a relic of the spirit of grandeur of the feudal government which terminated at that period. Be this as it may, they were handsome, because they were themselves contented and happy; and this noble impulse of the soul towards benevolence impressed on their physiognomy a majestic character, by which they will ever be distinguished from the ages that came before, and still more from that which has succeeded them.

These observations are not merely objects of curiosity;

they are much more important than is imagined; for it follows that, in order to form a nation of handsome children, and consequently of handsome men, physically and morally, it is not indispensibly necessary, as some physicians pretend, to subject the human species to regular purgations on certain days of the moon. Children confined to this sort of regimen, like most of those of our physicians and apothecaries, have figures of *papier maché*, and when they grow up they have pale complexions and vitiated constitutions like their fathers. To render children handsome, it is necessary to render them happy in a physical, and still more in a moral point of view. Every subject of vexation should be carefully removed, not by exciting within them dangerous passions, as is the cas with spoiled children, but, on the contrary, by preventing them from giving way too much to those that are peculiar to them, in which society produces a continual fermentation, and especially by guarding against inspiring them with more dangerous passions than have been implanted in them by Nature, such as tedious and vain studies, emulation, rivalship, &c. On this important subject we shall enlarge in another place.

The ugliness of a child proceeds almost always from his nurse or his preceptor. I have sometimes observed among so many classes of society more or less disfigured by our institutions, families of extraordinary beauty. On investigating the cause, I have found that these families, though belonging to the common people, were more happy in a moral view, than those of the other citizens, that the children were nursed by their mothers; that they learned their trade beneath the paternal roof; that they were brought up with great tenderness; that their parents loved each other; and that, notwitstanding the inconveniences attached to their condition, they lived together in a liberty and a union which rendered them good, happy, and contented. I have hence deduced this other conclusion, that we very frequently form an extremely false

opinion of the happiness of life. Upon seeing, on the one hand, a gardener with the figure of a Roman emperor, and on the other, a nobleman of high rank with the physiognomy of a slave, I imagined at first that Nature had committed a mistake; but experience proves that many a nobleman is from his birth to his death, in a succession of situations which do not allow him the liberty to gratify his own inclinations three times a year; for in childhood he is obliged to follow that of his masters and preceptors, and during the rest of his life to comply with the will of his prince, of ministers, of his rivals, and even of his enemies. Thus he finds a multitude of chains in his very dignities. On the other hand, there is many a gardener who passes his life without experiencing the slightest contradiction. Like the centurion in the gospel, he says to his servants: Come hither, and he comes: and to another: Do this, and he does it. This proves that Providence has assigned to our very passions a totally different part from that which society presents to them, for it frequently subjects men who have reached the summit of honor to the most abject slavery, and invests others in the lowest stations of life with the most unlimited sway.

For the rest, those who have been disfigured by the vices of our education and our habits, have it in their power to correct their features; and this observation I address in particular to the fair sex, who, with the same view, employ paint, white and red, and give themselves the insipid physiognomies of dolls. At the bottom they are in the right, for it is more prudent to conceal than to expose the cruel passions by which they are frequently consumed, especially o the eyes of so many men who study their character merely for the purpose of taking advantage of it. An infallible method of becoming impressive beauties is within their reach. This is to be internally good, gentle, compassionate, tender, benevolent, and pious. These affections of a virtuous soul will inscribe on their features celestial characters, which will retain their beauty even in extreme age.

I venture still farther to assert, that the more numerous are the disagreeable features occasioned in any individual by the vices of education, the more sublime will be the contrast produced in him by those which he shall acquire by the habits of virtue; for, when we find excellence under a repulsive exterior, we are as agreeably surprized as when we discover violets and primroses beneath a bramble-bush. Such was the sensation experienced on the first interview with the forbidding M. de Turenne, and such is at the present day the feeling inspired by the first view of a northern prince, who is as celebrated for his excellent qualities, as his royal brother was for his victories.* I have no doubt that the repulsive exterior of these two great men, served as a foil to set off still more the excellence of their hearts. Such was also the beauty of Socrates, who with the features of a debauchee, enchanted all those who beheld him when speaking of virtue.

We must not, however, assume the external appearance of qualities of which our hearts are destitute. Their false beauty produces an effect still more forbidding than the most marked ugliness; for when, under the mask of apparent virtue, we discover faithlessness and perfidy, we are struck with horror, as when we find a serpent concealed beneath flowers. Such is the odious character with which courtiers in general are reproached.

It is, then, moral beauty that we should endeavour to acquire, that its divine rays may shed their influence over our actions and our features. 'Tis in vain to boast, even in a prince, of birth, riches, ability, understanding; the people, in order to make themselves acquainted with him, are desirous of seeing his face; they form their opinion only by the physiognomy; this is, in every country, the first, and frequently the last, letter of recommendation.

* The author must here allude, I should conceive, to Ferdinand, brother of Frederic II. of Prussia. T.

OF CONCERTS.

A CONCERT is an order formed of several harmonies of various kinds. There is this difference between it and simple order, that the latter is frequently only a series of harmonies of the same species.

Each individual work of Nature exhibits harmonies, consonances, contrasts of different kinds, and forms a rea concert. This we shall unfold in the Study which treats of plants. With regard to these harmonies and these contrasts, we may here remark, that vegetables whose flowers have the least brilliancy, are inhabited by animals glowing with the most resplendent colors; and, on the contrary, that vegetables whose flowers are the most highly colored, afford a retreat to animals of the most dusky hues. This is very evident in the countries situated between the tropics, where the trees and the herbage that have few apparent flowers, are frequented by birds, insects, and even monkies adorned with the most lively colors. It is in the regions of India that the peacock displays his magnificent plumage on bushes whose verdure is parched by the sun; it is in the same climates that the aras, the loris, the parrots, enamelled with a thousand hues, perch on the grey branches of the palm-trees; and that flocks of little parroquets, green as emeralds, alight on the herbage of the fields turned yellow with the long heats of summer. In our temperate climates, on the contrary, most of the birds have dusky tints, because the greatest part of our vegetables have flowers and fruits highly colored. It is extremely remarkable, that those of our birds and insects which have lively colors, in general frequent vegetables without any apparent flowers. Thus the wood-grouse displays his brilliant plumage among the grey verdure of the pines, whose cones supply him with food. The goldfinch builds her nest in the rugged thistle. The most beautiful of our caterpillars, which is marbled with scarlet, is found on a

species of the milk-thistle that commonly grows among the sands and stones of the forest of Fontainebleau. On the contrary, our birds with dusky hues inhabit shrubs that have brilliant flowers. The bull-finch, with her black head, builds in the white-thorn; and this charming bird likewise forms a pleasing consonance and contrast with that tree by her blood-colored breast, and the sweetness of her notes. The nightingale, with brown plumage, loves to construct her nest in a rose bush, according to the tradition of the poets of the east, who have composed many elegant fables on the attachment of that melancholy bird for the rose. I could here introduce a multitude of other similar harmonies relative both to the animals of our own and of foreign countries. I have collected a very great number of them: but I acknowledge that they are too incomplete to form the entire concert of any one plant. I shall, however, enter more largely into the subject in the article on vegetables. I shall quote in this place only one example, which indisputably proves the existence of those harmonic laws of Nature: it is this—that they exist even in places on which the sun never shines. In the subterraneous habitations of the mole, we invariably find fragments of the bulbous root of the colchicum, close by the nest of her young. Now if we examine all the plants that usually grow in our meadows, we shall not find one that has more harmonies and contrasts with the black color of the mole than the white, empurpled, and liliaceous flowers of the colchicum. This plant likewise furnishes powerful means of defence to the feeble mole, against her natural enemy the dog, who is continually hunting after her in the fieilds; for it poisons him if he eats of it. For this reason the colchicum has likewise obtained the appellation of dogs-bane. The mole then finds a supply of food for her necessities, and a protection against her enemies in the colchicum; as does the bull-finch in the white-thorn. These harmonies are not only pleasing subjects for speculation, a great number of useful consequences may be

deduced from them; for, from what has just been suggested, it follows, for example, that if you wish to allure the bull-finch to your groves, you must plant the white-thorn in them; and if you would clear your field of the moles, you have only to destroy all the bulbs of the colchicum.

If to each plant you attach its elementary harmonies, such as those of the season in which it appears, of the situation in which it vegetates, the effects of the dews, and the reflections of light on its foliage, the movements to which it is subjected by the action of the winds, its contrasts and its consonances with other plants and with quadrupeds, the birds and the insects which are peculiar to it, you will perceive a delightful concert formed around it, with the harmonies of which we are still unacquainted. It is, however, only by pursuing this track that we shall be enabled to survey the immense and wonderful edifice of Nature. I exhort naturalists, the lovers of gardening, painters, and even poets, to study in this manner, and to take frequent draughts at this inexhaustible spring of taste and of delight. They will behold new worlds rising to their view, and without removing from their own horizon, they will make discoveries more curious than any contained in our books and in our cabinets, where the productions of the universe are frittered away and distributed among the petty drawers of our mechanical systems.

I know not yet what name I ought to give to the conformities which these particular concerts have with man. Certain it is, that there is no work of Nature whose concert, or, if you will, whose natural character is not strengthened by the habitation of man; and which does not, in its turn, communicate to the habitation of man some expression of grandeur, of gaiety, of terror, or of majesty. There is not a meadow which a dance of shepherdesses does not enliven, nor a tempest whose horrors are not heightened by a shipwreck. Nature exalts the physical character of her works to a sublime moral character, by collecting

them around man. This is not the place to treat of this new order of sentiments. I shall content myself with observing, that she not only employs particular concerts to express in detail the characters of her works; but when she intends to express the same characters on a great scale, she combines a multitude of harmonies and of contrasts of the same kind, to form of them a general concert which has only one single expression, let the field of her picture be ever so extensive.

Thus, for example, to express the malefic character of a poisonous plant, she combines in it clashing oppositions of forms and of colors, which are signs of mischievous properties; such as retreating and bristly forms, livid colors, dark greens spotted with white and black, virulent smells. But, to characterize a whole district which is unwholesome, she collects a multitude of similar dissonances. The air is there loaded with thick fogs; the turbid waters exhale only nauseous smells; on its putrid soil grows none but disgusting plants, as [illegible] dracunculus, whose flower presents the forms, the [illegible] r, and the smell of an ulcer. If a few trees arise in its clouded atmosphere, they are yews only, whose red and smoky trunks seem to have passed through the fire, and [illegible] black foliage serves as an asylum only to owls. If any other animal is to be found seeking a shelter beneath their shade, it is the blood-colored centipede, or the [illegible]oad, crawling over the humid and rotten soil. By these or similar signs, Nature drives man away from noxious situations.

If she intends to give him at seea the signal of a tempest, as she has opposed in the ferocious animals the fiery glare of the eyes to the thickness of the eye-brows, the the stripes and marbling with which they are painted, to the yellow color of their skin, and the silence of their movements to the tremendous noise of their voices, she collects, in like manner, in the sky, and on the deep, a multitude of clashing oppositions which announce, in con cert, impending devastation Dark clouds sweep throug

the air in the horrible forms of dragons; lurid lightnings here and there flash amid the gloom; the noise of the thunder with which their dark womb is impregnated, bursts like the roaring of the celestial lion. The orb of day, scarcely visible through their rainy and multiplied veils, emits long rays of a sickly light. The livid surface of the deep sinks and swells into broad, white, foaming surges. Hollow moans seem to issue from its billows. The black rocks, whiten at a distance, and repeat tremendous sounds interrupted by intervals of ominous silence. The sea, which alternately covers and leaves them naked, displays to the light of day their cavernous foundations The Norwegian lomb perches on one of these rugged points, uttering alarming cries, like those of a drowning person. The sea eagle soars aloft in the air, and, not daring to commit himself to the impetuosity of the winds, he struggles, screaming with a plaintive voice, against the tempest, which bends back his stubborn wings. The black procellaria flutters about, skimming the foam of the waves, and seeks, in the hollow of their moving vallies, a shelter from the fury of the wind. If this small and feeble bird perceives a vessel in the midst of the ocean, he takes a refuge along her side, and in return for the protection he demands, he announces the tempest before it arrives.

Nature invariably proportions the signs of destruction to the magnitude of the danger. Thus, for example, the signs of tempests near the Cape of Good Hope in many respects exceed those of our coasts. The celebrated Vernet, who has left us so many terrific representations of the sea, has has by no means depicted all its horrors. Every storm has a peculiar character in every latitude. Very different are the tempests of the Cape of Good Hope from those of Cape Hore, those of the Baltic from those of the Mediterranean, and those of the bank of Newfoundland from those of the coast of Africa. They farther differ according to the seasons, and even according to the hours of the

day. Those of summer are not the same as those of winter; and widely different is the spectacle of an enraged sea, glistening beneath the rays of a noon-day sun, and that of the same sea, illumed at midnight by a single lash of lightning. But you discover in them all the clashing oppositions I have mentioned.

In the tempests of the Cape of Good Hope, I have remarked one thing which admirably supports all that I have hitherto advanced relative to the principles of discord and of harmony, and which may, perhaps, suggest profound reflections to some one possessing abilities snperior to mine. It is this—that Nature frequently accompanies the signs of the disorder which convulses the ocean, with agreeable expressions of harmony, that serve only to redouble its horrors. Thus, for example, in the two storms to which I was exposed in those seas, I neither saw the face of heaven obscured by dark clouds, nor those clouds riven by alternate flashes of lightning, nor a sea turbid and lead colored, as in the tempests of European climes. The sky, on the contrary, was light-blue, and the sea azure; no other clouds hovered in the air than small aggregations of ruddy vapor, dark toward the centre, and tinged at the edges with polished copper. They took their departure from a single point of the horizon, and swept across the heavens with the rapidity of a bird. When the lightning shivered our main-mast in the middle of the night, the thunder did not roll: it made no more noise than would have proceeded from the report of a cannon fired close to us. Two other claps, which preceded this, were exactly similar. This was in the month of June, that is, in the winter of the Cape of Good Hope. I was overtaken by another storm on my return in the month of January, which is the midsummer of these parts. The ground of the sky was blue, as in the first, and only five or six clouds were perceptible above the horizon; but each of them white, black, cavernous, and of enormous magnitude, resembled a portion of the Alps, suspended in the air. This last was much less violent than the other

with its small ruddy vapours. In both, the sea was azure, like the sky, and on the curling crests of its vast surges, resembling a multitude of fountains, were formed very brilliant rainbows. These tempests, in the midst of light, are inexpressibly tremendous. The soul stands aghast on beholding the indications of tranquillity converted into signs of storm; unclouded azure in the heavens, and the rainbow upon the waves. The principles of harmony appear to be reversed; Nature seems to have assumed a character of perfidiousness, and to conceal her fury under the mask of benevolence. The rocks of those latitudes exhibit similar contrasts. John Hugo de Linschoten, who was very near those of the Jewess, in the channel of Mozambique, on which he was in great danger of being wrecked, informs us, that their aspect is hideous, for they are black, white, and green. Thus Nature heightens the characters of terror, by mingling with them agreeable expressions.

On this subject there is this farther essential observation to be made, that in these grand scenes of horror, she places the terrible close to you, and the agreeable at an immense distance, tumult on the seas, and serenity in the sky. She thus gives a prodigious extension to the sentiment of disorder; for you can foresee no end to tempests of this description. All depends on the first impulsion we undergo. The sentiment of infinity that is within us, and is ever making new efforts to propagate itself farther and farther, seeks to escape the physical evil with which it is surrounded; but, repelled, as it were by the serenity of the treacherous horizon, it falls back upon itself, and imparts greater force to its present painful affections, whose source appears to be inexhaustible. Such is the giant of storms, stationed by Nature at the entrance of the Indian Seas, and so ably delineated by Camoens. In our climates Nature produces quite contrary effects; for, in winter she redoubles our repose within our houses, by covering the face of heaven with dark and rainy clouds. All depends on the first impulsion which the soul receives.

Lucretius was very right when he observed that our pleasure and our security are augmented on shore by the sight of a storm at sea. Accordingly, a painter who wished to heighten in a picture the beauty of a landscape and the felicity of its inhabitants, would only have to represent in the back-ground a vessel tossed about by the winds and the raging deep: the happiness of the shepherds would then be augmented by contrast with the distress of the mariners. But if he were desirous, on the contrary, of increasing the horrors of a storm, it would be necessary for him to oppose the felicity of the shepherds to the distress of the seamen, and to place the vessel between the spectator and the landscape. The first sentiment depends on the first impulsion, and the ground forming a contrast with the scene, is so far from being unnatural, that it imparts to the latter increased energy, by throwing it back upon itself. Thus it is possible, by placing the same objects in different manners, to produce directly opposite effects.

If Nature redoubles the confusion of scenes of discord, by introducing into them some agreeable harmonies, such as the green colour in the rocks of the Jewess, or azure in the tempests of the Cape, she frequently throws some discordance into her most delightful concerts, for the purpose of heightening their pleasureable effect. Thus a noisy waterfall, rushing into a tranquil valley, or a black and rugged rock, rising from the midst of a verdant plain, enhances the beauty of a landscape. In the same manner, a mole on a beautiful face renders it still more pleasing Skilful artists have happily imitated these harmonic contrasts. Callot, when he intended to aggravate the horrors of his infernal scenes, placed among the demons the head of a fine woman on the body of an animal. On the contrary, the most celebrated painters in Greece, in order to render Venus more interesting, represented her with a cast in her eyes.

Nature never employs terrific contrasts but for the pur

pose of scaring man from some perilous situation. In all the rest of her works she combines only harmonic mediums. I shall not enter into an examination of their different concerts; it is a subject whose riches are inexhaustible. My ignorance is satisfied with having indicated some of their principles. I shall, however, attempt to trace a slight sketch of the manner in which she harmonizes our harvests, which, being the production of our agriculture, seem consigned to that monotony which characterizes most of the works of man.

It is, in the first place, remarkable that we find in them that charming shade of green, produced by the alliance of two opposite primordial colors, yellow and blue. This harmonic color is decomposed, in its turn, by another metamorphosis, towards the time of harvest, into three primordial colors, which are the yellow of the corn, the red of the poppy, and the azure of the blue-bottle. These two plants are always found among the grain of Europe, whatever pains may be taken in weeding and winnowing it. They form, by their harmony, a very rich purple tint, which sets off admirably on the yellow ground of the cornfield. If you study these two plants separately, you will find between them a variety of particular contrasts; the corollæ of the flowers of the blue-bottle are radiated, and of a light blue; those of the poppy are expanded, and of a deep red. The former throws out divergent branches; those of the latter are upright. We, likewise, find among the corn, the cockle, which rises to the height of the ear, with handsome purple flowers, in the form of a trumpet, and the convolvulus, with a flesh-coloured flower, crawling around the stalks, and encircling them with verdure like *thyrsi*. There are many other species of vegetables that commonly grow among corn, and form with it agreeable contrasts; most of them exhale sweet perfumes, and, when agitated by the breeze, you would be disposed, from their undulations, to imagine the whole a verdant sea, enamelled with flowers. Add to this, a certain agreeable

rustling of the ears, which, by its soft soothing murmurs, invites to repose.

These lovely forests are not destitute of inhabitants. You see, bustling beneath their shade, the green scarabæus, streaked with gold; and the monoceres, of the color of burnt coffee. This last insect delights to be among horse-dung; and his head is furnished with a plough-share, with which he turns up the earth like a laborer.

There are likewise many other charming contrasts in the flies and butterflies which are attracted by the flowers of the corn-fields, and in the manners of the birds by which they are frequented. The migratory swallow is incessantly skimming their surface, undulating like the waters of a lake; while the stationary lark rises perpendicularly above them, chanting her simple strains within sight of her nest. There also the domesticated partridge, and the transitory quail, find a situation for rearing their young. The hare frequently places her form in their neighborhood, and there peaceably nibbles the sow-thistle

These animals have relations of utility with man by their fruitfulness and their furs. It is remarkable that they are to be found in all the corn districts of Europe, and that their species are varied like the different situations which man is destined to inhabit; for there are different species of quails, of partridges, of larks, of swallows, of hares, adapted to the plains, the mountains, the heaths, the meadows, the forests, and the rocks.

With respect to corn, it has innumerable relations with the wants of man, and of his domestic animals. It is neither too high nor too low for his stature. It is easily managed and reaped. It yields grain for his poultry, bran for his hogs, forage and litter for his horse and his ox. Every plant that grows among it possesses virtues particularly adapted to the maladies incident to the laboring man. The wild poppy is a cure for the pleurisy, it procures sleep, stops hemorrhages, and spitting of blood. The blue-bottle is diuretic, healing, cordial, and cooling; it

cures the stings of venomous insects, and inflammation of the eyes. Thus the husbandman finds all needful medicines in the field he cultivates.

The culture of corn exhibits to him many other pleasing concerts with human life. Its shadow informs him of the hour of the day; its growth reminds him of the rapid flight of the seasons; and he reckons his fugitive years by the guiltless harvests he has reaped. He is not haunted like the inhabitant of the city, with the apprehension of conjugal infidelity, or of too numerous a progeny. His labors are always surpassed by the benefits of Nature. As soon as the sun has entered the sign of Virgo, he summons his kindred, he invites his neighbors, and at the dawn of day, he proceeds at their head, sickle in hand, to the ripened field. His heart throbs with joy at the sight of the swelling sheaves, and of his children, dancing around him, crowned with garlands of blue-bottles and wild poppies. Their sports remind him of the amusements of his early life, and of his virtuous ancestors, whom he hopes to meet again in a happier world. At the sight of his copious harvests he doubts not the existence of a God; and at the recollection of the delightful periods which they revive within him, he returns thanks to the Almighty for having united the transient society of men by an eternal chain of blessings.

Ye flowery meads, ye majestic, murmuring forests, ye mossy fountains, ye wild rocks, frequented only by the solitary dove, ye enchanting retreats, which delight us by your ineffable concerts! happy is the man who is permitted to raise the veil which covers your hidden beauties! but still more happy is he who has it in his power to enjoy them in peace, in the inheritence of his forefathers!

OF SOME OTHER LAWS OF NATURE IMPERFECTLY KNOWN.

There are some other physical laws, which have not yet been profoundly investigated, though mankind have

had a faint glimmering of them, and have made them the subject of frequent discussion. Such is the law of attraction. It has been discovered in the planets, and in several metals, as in iron and the loadstone, in gold and mercury. I believe attraction to be common to all the metals, and even to all the fossils; but that it acts in each of them under particular circumstances, which have not yet been observed. Each of these metals may, perhaps, turn towards different points of the earth, as the magnet points toward the north, and towards places which contain iron-ore. In order to ascertain this by experiment, it would probably be necessary that each metal should be provided with its peculiar attraction, which would be the case, in my opinion, if it were joined to its contrary. Who knows whether a gold needle, rubbed with mercury, might not have attractive poles, as a steel needle has when rubbed with a loadstone? With this preparation, or some other better adapted to its nature, it might indicate the places containing ore of that rich metal. Perhaps it might determine general points of direction to the east or to the west, which might serve to ascertain the longitude more accurately than the variations of the magnetic needle. If there be a point at the pole around which the globe seems to turn, there may possibly be one under the equator, from which its rotary motion commenced, and which may have determined that motion. It is extremely remarkable, for example, that all the seas are filled with univalve shell-fish, of an infinity of very different species, all of whose spirals increase in the same direction, that is, from left to right, like the motion of the globe, when the mouth of the shell is towards the north, and turned to the ground. The only exceptions to this rule are formed by a very small number of species, which, for this reason, are called *unique*. The spirals of these circulate from right to left. A direction so general, and exceptions so rare among shells, undoubtedly have their causes in Nature, and their epochs in the unknown ages in which their germs were created.

It is impossible that they can proceed from the present influence of the sun, which acts upon them in a thousand different aspects. Have they received this direction in conformity to some general current of the ocean, or to some unknown point of attraction of the earth in the north or the south, in the east or the west? These relations will appear strange, and probably frivolous, to our men of science; but all Nature forms one grand chain: a trivial observation often leads to important discoveries. A small piece of iron, which turns towards the north, guides navies through the deserts of ocean; and a reed of an unknown species, thrown upon the coast of the Azores, suggested to Christopher Columbus the idea of the existence of a western world.

Be this as it may, certain it is that there are a great number of particular points of attraction, scattered over the earth, such as the matrices which renew the mines of metals by attracting the metallic particles dispersed in the elements. It is by means of these attractive matrices, that those mines are inexhaustable, as has been remarked in many places, among others in the Isle of Elba, in the Mediterranean. This little island is one entire mass of iron-ore, from which, in Pliny's time, a prodigious quantity of that metal had been extracted, without producing, as he tells us, the smallest perceptible diminution. Metals have likewise other attractions; and, if I might presume to deliver my opinion by the way, I consider these themselves as the principal matrices of all fossil substances, and as the ever active means employed by Nature for renovating the mountains and the rocks, which the action of the other elements, and especially the injudicious labors of man, are incessantly tending to impair.

I shall here remark on the subject of gold-mines, that they are situated, like these of all other metals, not only in the most elevated parts of continents, but in icy mountains.

The celebrated gold mines of Chili and Peru, are, it is

well known, in the Cordilleras: those of Mexico are situated in the vicinity of the mountain of Santa Martha, which is covered with snow all the year round. The European rivers, which wash down particles of gold upon their shores, issue from icy mountains. The Po, in Italy, has its source in those of Piedmont. But to go no farther than France, we reckon in that country ten rivers which carry along particles of gold with their sands, and all of which spring from mountains of ice. Such is the Rhine from Strasburg to Philipsburg, the Rhone in the district of Gex, the Doubs in Franche Comtè, which three all take their rise in the icy mountains of Switzerland. The Cese and the Gardon descend from the Cevennes. The Ariege in the district of Foix; the Garronne in the vicinity of Toulouse; the Salat, in the county of Couserans, and the rivulets of Ferriet and Benagues, all have their sources in the icy mountains of the Pyrenees.

This observation may be extended, I believe, to all the gold mines in the world, even to those of Africa, for such of its rivers as wash down the most gold-dust, the Senegal for instance, descend from the mountains of the Moon.

It may be objected, that formerly great quantities of gold were found in Europe, in places where there are no icy mountains; that it is picked up on the very surface of the earth, as in Brasil, and that it is only a few years since a lump of several pounds weight was found on the bank of a river in the district of Cinaloa, in New Mexico. But if I might venture to hazard a conjecture on the origin of this gold, scattered on the surface of the earth, in the old continent of Europe, and still more in that of the new world, I imagine that it must proceed from the total effusions of the ices of the mountains, which took place at the deluge, and that as the wrecks of the ocean covered the western parts of Europe, as those of the vegetable earths were spread over the eastern portion of Asia, so those of the minerals of the mountains were hurried along to other countries, where, in the early ages, their fragments were

found in grains, and even in entire masses. So much is certain, that when Christopher Columbus discovered the Lucayo Islands, and the Antilles, he found among the natives gold of a base alloy, the produce of the commerce which they carried on with the inhabitants of the continent: but they had no mines within their territory, notwithstanding the prejudice entertained at that time, as it still is by many at the present day, that the sun formed this precious metal in the bosom of the earth of the torrid zone. For my part, I find, as I have already observed, that gold is much more common in the vicinity of icy mountains, whatever may be their latitude; and I suspect from analogy, that very rich mines of that metal must exist in the north. It is probable that the waters of the deluge carried considerable portions of it into the northern countries. We read, I believe, in the book of Job, the Arabian, this remarkable expression: "Gold cometh out of the north." Certain it is, that the first commerce of India with Europe was carried on by the north, as has been clearly demonstrated by the Baron Stralenberg, a Swedish officer, exiled after the battle of Pultowa to Siberia, of which he published an excellent description. He says that it is still possible to pursue by the traces the route of the ancient Indians, who ascended the river Petzora, which discharges itself into the White Sea. On its banks are found many of their tombs, some of which contain manuscripts on silk stuffs, in the language of Thibet; and on the rocks of its shores may be perceived characters traced upon them with a red substance, that cannot be effaced. From this river they proceeded, by means of leathern boats, over the lakes of the Baltic, where they coasted along the northern and western shores of Europe. This track was known to the Indians even at the time of the Romans; for Cornelius Nepos relates that a king of the Suevi made a present to Metellus Celer of two Indians, who had been thrown by stress of weather, with their leathern canoe, on the coast adjacent to the

mouth of the Elbe. It is difficult to conceive what the Indians, the inhabitants of a warm climate, could go in quest of so far to the north. What use could they have made in India of the furs of Siberia? They probably went thither in search of gold, which might then be common in those regions on the surface of the earth.

Be this as it may, it is presumable that gold mines are placed in the most elevated situations of the continent, that their matrices collect in the atmosphere the volatilized particles of gold, which ascend with the fossil and aquatic emanations, wafted thither by the winds from every quarter. But they exercise over men attractions still more powerful.

It appears as if Nature, in burying the focuses of this rich metal under everlasting snows, had intended to furnish it with ramparts still more inaccessible than the bosom of the rocks, lest human avarice should at length discover the means of destroying them entirely. It has become the most powerful bond of society, and the perpetual object of the labors of our fleeting life. Ah! if Nature were disposed to punish this insatiable thirst of the European nations for a metal so useless as a real necessary of life, she need only to convert the territory of some one of them into gold. Every other nation would instantly flock thither, and would soon exterminate the inhabitants of that wretched country. Of this the Peruvians and the Mexicans have had the dreadful experience.

There are metals less highly valued, but much more useful, whose elementary attractions might probably procure us important advantages.

The peaks of mountains and their lengthened crests are filled, as we have already seen with iron and copper, intermingled with a vitreous body of granite or quartz which attracts rains and storms like real electric rods. There is not a seaman but what has seen these crests covered a thousand times with a cloudy cap that gathers round and frequently shrouds them from the view, without ever sus-

pecting the cause of this phenomenon. Our philosophers, on the other hand, from the inspection of their maps, have taken these rugged protuberances for the wrecks of a primitive world, without paying any attention to their effects. They ought to have observed that these pyramids and their metallic crests, as well as most of the ores of iron and copper, are invariably found on elevated situations and at the source of all the rivers, of which they are the primary causes by their attractions. The general inattention to this subject proceeds from this circumstance, that seamen observe without reasoning and philosophers reason without observing. Undoubtedly, if the experience of the one had been united to the sagacity of the other, we might have expected prodigies. I am persuaded that, in imitation of Nature, man might acquire the art of forming with electric stones artificial fountains, which would attract rainy clouds in dry and parched situations, as chains and bars of iron attract thunder-storms. It is true that princes must defray the expences of these grand and useful experiments, but they would perpetuate their memory to the latest posterity. The Pharaohs who built the pyramids of Egypt would not have drawn upon themselves the execration of their subjects, as Pliny informs us they did, for labors so enormous and so useless, had they reared amid the sands of Upper Egypt, an electrical pyramid which might there have formed an artificial fountain. The Arab who should resort to it at this day to allay his thirst, would still bless their names, which, according to the testimony of Pliny, were at his time forgotten and unknown. For my part I think that several metals would be capable of producing similar effects. An officer of high rank in the service of the king of Prussia informed me, that having remarked that lead attracted vapors, he availed himself of this quality to dry the atmosphere of a powder magazine. This magazine was constructed under ground in the gorge of a bastion, and could not be used on account of its humidity. He ordered the roof of the place where the barrels of gun-

powder were deposited to be lined with a coating of lead; the vapors of the vault collected upon it in drops, trickled down the sides, and left the barrels perfectly dry.

It is to be presumed that every metal and every fossil possesses repulsion as well as attraction; for these two laws always go hand in hand. Contraries seek out each other.

There are farther a multitude of other harmonic laws as yet undiscovered; such are the proportions of the magnitude and the duration of existence in vegetable and sensible beings, which differ exceedingly, though their nutriment and their climate are the same. Man, in his youth, sees the dog, his contemporary, and the sheep which he fondled when a lamb, expire of old age. Though the former lived at his table and the latter on the herbage of his meadow, neither the fidelity of the one, nor the temperance of the other could prolong their days; whereas animals which feed only on carrion and plunder, live for ages, as the raven. We have no guide in the prosecution of these researches, unless we follow the spirit of conformity, which is the basis of our own reason as it is likewise of the reason of Nature. By consulting this we shall find, that if such and such a carnivorous animal, as the raven, is long-lived, it is because his services and his experience are long necessary for purifying the earth in places where impurities are continually renewing, and which are frequently at great distances from each other. If, on the contrary, the life of an innocent animal is of short duration, the reason is because his flesh and his skin are necessary to man. If the domestic dog so frequently diffuses by his death the liveliest sorrow among the children of the family whose messmate and companion he has been, Nature, undoubtedly, intended to give them in the loss of an animal so worthy of the affections of the human heart, the first experience of the privations which human life is destined to suffer.

Sometimes the duration of the life of an animal is proportioned to the duration of the vegetable on which it

feeds. A multitude of caterpillars are born and die with the leaves which supply them with nourishment. There are insects whose existence is limited to five hours; such is the ephemeris. This species of fly, about half the size of the tip of the little finger, is produced from a fluviatic grub, which is found particularly at the mouth of rivers, at the water's edge in the mud, where it digs trenches in quest of subsistence. This grub lives three years, and at the expiration of that time about midsummer-day, it is transformed, almost instantaneously, into a fly, which comes into the world at six in the evening, and dies at eleven at night. No longer time is necessary for copulation and for depositing its eggs on the mud which the waters have deserted. It is extremely remarkable that this insect copulates and lays her eggs exactly at the season of the year when the tides are the lowest, and when the rivers forsake at their mouths, the greatest portion of their beds. It is then that she receives wings to enable her to go and deposit her eggs in places which have been abandoned by the waters, and to extend, in the form of a fly the domain of her posterity, at the time when, as a grub, her territory is the most contracted. I have likewise remarked in the drawing and miscrocopic sections given of this insect by the ingenious Thevenot towards the conclusion of his collection, that, in the state of a fly it has none of the organs of nutrition either external or internal. For the short time it is destined to live, these would have been entirely useless.

Nature has made nothing in vain. It cannot be supposed that she has created momentary lives, and beings infinitely minute, merely to fill up imaginary chains of existence. The philosophers who ascribe to her these pretended plans of universality, which are destitute of proof, and who make her descend into the infinitely small for purposes equally frivolous, represent her as acting nearly in the same manner as a mother who gives as playthings to her children little coaches and tiny pieces of

furniture, which are of no manner of use, but are made in imitation of articles of domestic necessity or convenience.

The aversions and the instincts of animals emanate from laws of a superior order, into which we shall never be able to penetrate in this world; but when these secret conformities escape our perception, we ought to refer them, as well as every other, to the general conformity of beings, and especially to that of man. Nothing is so luminous in the study of Nature, as to refer every thing that exists to the goodness of God, and to the necessities of man. This view of the subject not only discloses to us a multitude of unknown laws, but sets bounds to those with which we are acquainted and which we believe universal. If Nature, for example, were governed solely by the laws of attraction, as those imagine who have made them the basis of so many systems, every thing would be in a state of repose. Bodies, tending towards one common centre, would accumulate and range themselves round it according to their gravity. The substances of which the globe is composed would be so much the heavier in proportion as they approached nearer to the centre, and those on the surface would all be reduced to one level. The bason of the seas would be filled with the wreck of the land; and this vast edifice, formed of harmonies so various, would soon be nothing more than an aquatic globe. All bodies chained down by one common descent, would be condemned to a state of everlasting repose. On the other hand if the law of projection, which is employed for explaining the motions of the heavenly bodies, supposing they have a tendency to fly off by the tangent of the curve which they describe—if, I say, this law existed, all the bodies which are not adherent to the earth, would be hurled from it, like stones from a sling; and the globe itself, in obedience to the same law, would fly off from the sun for ever. Sometimes it would traverse in its unbounded career, spaces of immensity in which not a single star would be perceptible during the course of many ages;

sometimes, floating through regions where chance might have collected the matrices of the creation, it would pass along amid elementary parts of suns, congregated by the central laws of attraction, or dispersed into sparks and rays by those of projection. But supposing these two contrary powers were so happily combined in its favor as to fix it, with its vortex, in a corner of the firmament where they could act without destroying each other, it would present its equator to the sun, with as much regularity as it describes its annual course about him. These two constant movements would never produce that other motion so varied, by which it daily inclines one of its poles toward the sun, till its axis has formed on the plane of its annual circle an angle of twenty-three degrees and a half; and then that other retrogade motion by which it presents to him the opposite pole with equal regularity. Far from turning its poles alternately towards him, in order that his genial heat may alternately melt their ices, it would bury them together with a part of the temperate zones in eternal night and winter, while the remaining portion of its circumference would be burned up by the too constant fire of the tropics.

But, were we to suppose, together with these constant laws of attraction and projection, a third versatile law giving to the earth the motion which produces the seasons, and a fourth communicating to it the diurnal motion of rotation round itself, and that none of these laws, so opposite, should ever interfere with the others, and at length oblige the earth to obey but one single impulsion; it would be impossible to assert, that they had determined the forms and movements of the bodies which are on its surface. In the first place, the force of projection, or centrifugal power, would not have left upon it a single detached body. On the other hand the force of attraction, or gravity, would not have permitted the mountains to rise and still less the metals which are the heaviest parts of them to be placed on their summits where they

are commonly found. If we suppose that these laws are the *ultimatum* of chance, and that they are so combined as to form one single law, for the same reason as they cause the earth to move round the sun, and the moon round the earth, they ought to operate in the same manner with respect to the individual bodies on the surface of the globe. We ought to see the rocks isolated, the fruits detached from the trees, the animals which are not provided with claws turning round it in the air, as we see the parts which compose Saturn's ring turning round that planet. It is gravity alone, we are repeatedly told, that acts on the surface of the globe, and prevents the separation of bodies from it. But if it absorbs the other powers, why, as we have before asked, has it permitted the mountains to rear their heads? How can the centrifugal power have projected to a prodigious height the long crest of the Cordilleras, while it leaves motionless the volatile scarf of snow which covers them? Why, if the action of gravity be now universal, has it no influence on the soft bodies of animals, when, shut up in the womb of the mother, or in the egg, they are in a state of fluidity? All the numerous offspring of the earth, animals and vegetables ought to be rounded into balls, like their general mother. The heaviest part of their bodies ought, at any rate, to be situated below, at least in those that possess the power of motion; on the contrary, they are frequently uppermost, and supported by limbs much lighter than the rest of the animal, as may be seen in the horse and the ox. Sometimes they are between the head and the feet, as in the ostrich, or at the extremity of the body, in the head, as in the human species. Others, as the tortoise, are flat; others, such as reptiles, are lengthened out into the form of spindles; all, in short, have figures infinitely diversified. Even vegetables, which seem to be entirely subjected to the action of the elements, have conformations varied without end. But how comes it that animals have within themselves the principles of so many different motions? Why

has not gravity nailed them down to the surface of the earth? They ought, at most, only to creep upon it. How happens it that the laws which govern the courses of the stars, those laws whose influence modern philosophers have extended even to the operations of the human soul, should permit the birds to soar into the air, and to fly at pleasure to the west, to the north, to the south, notwithstanding the united powers of the attraction and of the projection of the globe?

It is conformity which has regulated these laws, and has generalized or suspended their effects, according to the necessities of created beings. Though Nature employs an infinite multitude of means, she permits man to know nothing more than their end. Her works are liable to rapid dissolutions; but she always suffers him to perceive the everlasting consistency of her plans. She aims not to render man ingenious and proud; her object is to make him happy and good. She universally mitigates necessary evils; she universally multiplies blessings, in many cases superfluous. In her harmonies, formed of contraries, she has opposed the empire of death to that of life; but life lasts a whole age, and death but a moment. She allows man long to enjoy the expansions of beings so delightful to witness; but she conceals from him, with maternal precaution, their transient stages of dissolution. If any animal dies, if a plant is decomposed in a morass, putrid emanations and reptiles of a disgusting form drive us away from them. An infinite number of secondary beings are created for the purpose of hastening their decomposition. If cavernous mountains and rocks exhibit appearances of ruin, the owls, the birds of prey, the ferocious animals which make them their retreat, keep us at a distance from those situations. Nature places far from us the spectacles and the ministers of destruction, and invites us to her harmonies. She multiplies them according to our necessities, far beyond the laws which she seems to have prescribed to herself, and the measure we ought to expect of her. It is

thus that the dry and barren rocks repeat, by their echoes, the murmurs of the billows and of the forests, and that the smooth surface of the waters, which have neither hills nor forests, represent their colors and forms in their reflections.

It is from this superabundant benevolence of Nature that the action of the sun is multiplied wherever it is most necessary, and that it is diminished in situations where it might prove detrimental. First, the sun is five or six days longer in our northern hemisphere, because this hemisphere comprehends the greatest portion of the continents, and the greatest number of inhabitants. His disk appears above the horizon before he rises, and after he has set, which, together with the twilight, considerably encreases the natural length of our days. The colder it is, the more extensive is the refraction of his rays: for this reason it is greater in the morning than in the evening, in winter than in summer, and at the beginning of spring than at the commencement of autumn. When the orb of day has left us for the night, the moon reflects her light upon us, with varieties in her phases, which have relations, hitherto unknown, with numerous species of animals, and especially of fishes, that travel only by night at the periods which she indicates to them. The farther the sun withdraws from either pole, the more his rays are refracted at it. But when he has abandoned it, the want of his light is supplied in a wonderful manner. First, the moon, by an incomprehensible movement, takes his place, and appears constantly above the horizon without setting, as was observed in Nova Zembla in 1596, by the unfortunate Dutchmen, who there passed the winter, under the 76th degree of north latitude. It is in these dreadful climates, that Nature multiplies her resources, in order to confer on sensible beings the blessings of light and heat. The heavens are there illumined by the *aurora borealis*, which darts up to the very zenith rays of moving light, white, red, and gold-colored. The pole there sparkles with more luminous stars than the rest of the firmament. The snows which

cover the earth, serve to shelter part of the plants, and to diminish by their brilliancy the darkness of night. The trees are there clothed with thick coats of moss, which take fire at the least spark; the very ground is carpeted with them, especially in the woods, to such a depth, that I have more than once sunk, in summer, up to the knees in those of Russia. Lastly, the animals which inhabit these regions, are robed in furs to the very tips of their claws. When the season arrives for restoring heat to these climates, the sun appears there long before his natural time. Thus the Dutch mariners, whom I have just mentioned, beheld him, with astonishment, above the horizon of Nova Zembla, on the twenty-fourth of January, that is fifteen days earlier than they expected. This unhoped phenomenon filled them with joy, and overthrew the calculations of their intelligent pilot, the unfortunate Barentz. It is then that the luminary of day there redoubles his heat and his light by parhelia, which, like so many mirrors fixed in the clouds, reflect his disk upon the earth. He summons from Africa the winds of the south, which, passing over Zara, whose sands are then heated by the vicinity of the sun to their zenith, charge themselves with igneous particles, and dash, like battering-rams of fire, against that tremendous cupola of ice that covers the extremity of our hemisphere. Its enormous vault, dissolved by the heat of these winds, is broken by their violent assaults; fragments, lofty as mountains, detach themselves from it, and floating at the discretion of the currents, which carry them towards the line, they sometimes advance as far as to the 45th degree,* cooling

* Instances are not wanting of these mountains of ice being seen still farther towards the south. In the spring of 1805 a vast quantity of ice, favoured by the prevalence of northerly winds, floated as far southward as Madeira. Some vessels were lost among it on their passage from England to New York and Baltimore, and many others sustained considerable injury. On the 25th of May, the ship Nancy, of Liverpool, being in latitude 40 deg. 12 min. longitude 47 deg. 2 min. fell in with two immence mountains of ice, amidst ten large

the southern seas by their vast effusions. Thus the ices of the pole impart coolness to the hot seas of Africa, as the sands of Africa transmit hot winds to the ices of the pole.

But as cold is, in its turn, a very great blessing in the torrid zone, Nature employs a thousand methods to extend its influence in that zone, and to weaken the heat and the light of the sun. In the first place she has denied it the refractions of the atmosphere; there is scarcely any twilight before the rising of the sun, and still less after his setting. When he is at the zenith, he shrouds himself in rainy clouds, which overshadow the earth, and cool it by their waters: besides, these clouds being often accompanied with thunder-storms, the explosions of their fires dilate the superior stratum of the atmosphere, which is frozen at the elevation of two thousand five hundred fathoms under the Line, as is proved by the everlasting snows, which, at that height, cover the summits of some of the Cordilleras. By their explosions and concussions, they cause colums of this congealed air to flow from the upper region of the atmosphere into the lower, which is suddenly cooled by them, as we experience in summer, in our own climates, immediately after a thunder-storm. In like manner the effusions of the polar ices cool the southern seas; and the polar winds frequently blow on the hottest parts of their shores. Nature has, moreover, placed in the bosom of the torrid zone and its vicinity chains of icy mountains, which accelerate and redouble the effects of the polar winds, especially along the sea-coasts, where fermentation is most to be apprehended from the accumulation of animal and vegetable bodies, which the waters are there incessantly depositing. Thus the chain of Mount Taurus, perpetually covered with snow, begins in Africa, on the burning borders of Zara, and

islands of the same. Their elevation was upwards of one hundred feet above the surface of the sea, and in passing under the lee of one of them, the Nancy was for some time entirely becalmed. T.

coasting along the Mediterranean, passes into Asia, where it throws out here and there long arms, which embrace the gulphs of the Indian Ocean. In like manner, in America, the extended chain of the Cordilleras, of Peru and of Chili, together with the elevated ridges which intersect Brasil, cools the lenghtened and burning shores of the South Sea, and of the Gulph of Mexico.

These elementary dispositions are only part of the resources of Nature for tempering the heat of warm countries. She shades the earth with creeping vegetables and trees, in the form of a parasol, some of which, as the cocoa of the Sechelles Islands, and the talipot of Ceylon, have leaves twelve or fifteen feet in length, and seven or eight in breadth.

She clothes the animals of those regions with smooth skins, and gives to them in general, as well as to the verdure, dark or dusky tints, for the purpose of diminishing the reflections of the heat and of the light. This last consideration leads us to make here a few observations on the effects of colors; the little we shall say on the subject, will convince the reader, that they are not produced by chance, that it is for very wise reasons that half of them proceed in their composition towards the light, and the other half in their decomposition towards darkness; and that all the harmonies of this world arise from contraries.

Naturalists consider colors as the effect of accident. But if we consider the general uses in which Nature employs them, we shall be convinced that, even on the very rocks, not one single hue has been conferred in vain. Let us first observe the principal effects of the two extreme colors, white and black, with regard to the light. Experience proves that of all the colors white best reflects the rays of the sun, because it transmits them, without any tint as pure as it receives them; and black, on the contrary, is the least adapted to their reflection, because it extinguishes them. This is the reason why gardeners whiten the walls of their espaliers, to accelerate the maturity o

their fruits by the reverberation of the sun; and why opticians blacken the sides of the *camera obscura*, lest their reflections should alter the luminous picture painted within it.

Nature, in consequence, frequently employs the white color in the north, to augment the light and the heat of the sun. Most of the soils there are whitish, or of a light grey. The rocks, the sands, are filled with mica and with specular particles. Besides, the whiteness of the snows by which they are covered in winter, and the vitreous and crystalline parts of their ices, are admirably adapted to weaken the action of the cold, by reflecting the light and heat in the most advantageous manner. The trunks of the birch-trees, of which the greatest part of their forests consist, have bark white as paper. Nay, in some places, the earth is clothed with vegetables perfectly white. "In the eastern part," says an intelligent Swede,* "of the lofty mountains which separate Sweden from Norway, exposed to the utmost severity of the cold, there is a thick forest, and singular in this respect, that the pine which grows in it is rendered black by a species of filamentous lichen, which is profusely suspended from it; whereas the earth all around is covered with a white lichen, which rivals the snow in the brilliancy of its color." Nature there bestows the same hue on most of the animals, as the white bear, the wolf, the partridge, the hare, the ermine: others become perceptibly whiter in winter, as the fox and the squirrel, which are red in summer, and greyish in winter. If we even consider the filiform figure of their hairs, their polish and transparency, we shall find that they are formed in the most proper manner for reflecting and refracting luminous rays. Their whiteness must not be looked upon as a proof of degeneracy or debility in the animal, as has been supposed by some naturalists, from analogy to human hair, which turns white in old age, from

* Charles Frederic Hoffberg, in his Natural History of the Reindeer.

the want of radical moisture, say they: for nothing can be more thickly covered than most of these furs, nor more vigorous than the animals which are clothed in them. The white bear is one of the strongest and most formidable animals in the world: it frequently requires several musket-balls to dispatch him.

Nature, on the contrary, has tinged with red, with blue, and with dusky and black hues the soils, the vegetables, the animals, and even the men of the torrid zone, in order to extinguish the fires of the burning atmosphere which surrounds them. The soils and the sands of the greatest part of Africa, situated between the tropics, are of a brown red, and the rocks are black. The islands of France and Bourbon, which are on the skirts of that zone, are in general of the same dark hue. I have seen fowls and parrots, not only whose plumage, but whose skin was dyed black. I have likewise beheld there fishes perfectly black, especially among the species which live upon the shoals near the surface of the water, such as the oldmaid and the ray. As animals turn white in winter in the north, in proportion as the sun retires, so those of the south assume darker hues in proportion as that luminary approaches them. When he is at the zenith, the sparrows of those countries have red patches on the breast, and the plumage of the heart of the same color. There are even birds which change their color three times a year, having, as it were, one dress for spring, another for summer, and a third for winter, according as the sun is at the Line, at the tropic of Cancer, or at that of Capricorn.*

* Thus white increases the effect of the sun's rays, and black diminishes it. The inhabitants of Malta whiten the interior of their apartments, in order, as they say, that they may perceive the scorpions, which are very common in that island. In this they are guilty, in my opinion, of two errors; the first is, that they make use of a wrong color, for the scorpion, which is grey, would be much more perceptible on a dark ground; the second, which is of still greater importance, is, that they increase the reverberation of the light to such a degree as materially to injure the sight. To this cause I ascribe the disorders of the eye, which are so general among the natives. Our citizens, in summer, wear white hats in the country,

A circumstance equally remarkable and consistent in the use which Nature makes of these colors in the north and in the south, is this: that in every country the whitest part of the animal is the belly, because most heat is wanted there for digestion and other functions; and, on the contrary, the head is the most highly colored, especially in the animals of torrid regions, because, in the animal economy, that part requires to be kept the coolest.

It is impossible to assert that the bellies of animals preserve their whiteness, because they are sheltered from the sun, and that their heads have a stronger coloring because they are more exposed. It would appear, from analogy, that the natural effect of light ought to be, to invest with its lustre every object which it touches, and that, consequently, the soil, the vegetables, and the animals of the torrid zone ought to be white: and that night, on the contrary, acting for several months successively on the poles, should communicate to every object there a dusky hue Nature subjects not herself to mechanical laws. Whatever may be the physical effect of the presence or of the absence of the sun, she has contrived toward the north to place very black spots on the whitest bodies, and toward the south, white spots on bodies extremely black. Sh has blackened the tip of the tail of the Siberian ermine, that these little animals, which are else entirely white, running over the snow, on which they scarcely leave any traces of their footsteps, may distinguish each other when proceeding in a train amid the luminous reflections of the long nights of the north. Perhaps, likewise, this blackness, opposed to the white color, may be one of those distinguishing characteristics which she has given to beasts

and then complain of the head-ache. All these evils proceed from the neglect of the study of Nature. In the Isle of France they employ for wainscotting the wood of the country, which, in time, becomes perfectly black: but that color is too dismal. Nature appears to have foreseen the services which man would derive from the interior of trees; their wood is brown in most of the hot countries, and white in the northern regions, as in the fir and the birch.

of prey, such as the black muzzle and the black paws o the white bear. The ermine is a species of weasel. There are also in the north foxes entirely black; but they are indemnified for the want of the influence of the white color, by the thickest and warmest of furs; it is the most valuable of all those of the north. Even there, however, this species of foxes is very rare. Nature has probably clothed them in black because they live under ground, amid hot sands, or in the vicinity of volcanoes, or for some other reason unknown to me, but corresponding to their wants. It is thus that she has clothed in white the bird of paradise of the tropics, which flies at a prodigious elevation above the sea, and passes a great portion of its life in the vicinity of an icy atmosphere. These exceptions by no means overthrow the general adaptation of those two colors: on the contrary, they confirm it, since Nature makes use of them to diminish or to increase the heat of the animal, according to the climate in which it lives.

I now leave it to naturalists to explain the reason why cold should make the hair of animals grow in the north, and why heat should shorten that of the animals of the south, or cause it to fall off, contrary to all the laws of physics, theoretical and even practical: for we know from experience that winter retards the growth of the human hair and beard, and that summer accelerates it.

I think I can discover a law very different from the law of analogies which we so commonly ascribe to Nature, because it is adapted to our weakness, by affording a pretence to explain every thing with the assistance of a small number of principles. This law, infinitely varied in its means, is the law of compensations.* It is a consequence

* In reflecting on these compensations, which are very numerous, and, among others, on those of the light of the sun, which embrown bodies, in order to weaken their reflections, I conceived that fire must likewise produce the most proper substance for abating its own activity. Of this, indeed, I have had frequent experience, by throwing ashes upon the flame of my fire. By this method I have been enabled to extinguish it suddenly, almost without smoke. Being one

of the universal law of the conformity of beings, and a sequel of the union of contraries, of which the harmonies of the universe are composed. Thus it frequently happens, that effects, instead of being the results of causes, are the very contrary. Nature, for example, has been pleased to clothe with white several birds of warm regions, as the heron of the Antilles, and the parrot of the Moluccas, known by the appellation of cockatoo; but she has given their plumage such a disposition as weakens the reflection. It is very highly remarkable that she has furnished the heads of these birds with tufts and plumes, which overshadow them; because, as we have already observed, the head is that part of the body, which, in the animal economy, it is most necessary to keep cool. Such is our crested hen, which comes originally from Numidia. Nay, I do not believe that birds with tufted heads are to be found any where but in southern regions. Most of those of the north, on the contrary, have the belly and legs covered with tippets, formed of down, resembling the finest wool.

This is likewise worthy of remark in the white birds and quadrupeds of the south, which live in a warm atmosphere, namely, that all of them, I believe have a black skin, which is sufficient to deaden the reflection of the color with which they are clothed. Robert Knox, speak-

day in a sea-port, I recollect seeing a great cauldron of pitch, melting for the purpose of caulking ships, take fire. Inexperienced persons instantly threw water upon it, but the boiling and inflamed matter poured in torrents of fire over the top of the cauldron. I did not think a spoonful would be left at the bottom, when an old seaman ran up, and instantly extinguished the flames by throwing upon them a few shovelfuls of ashes. I am, therefore, of opinion, that, from this application, in conjunction with that of water, great benefit might be derived in conflagrations; for ashes would not only deaden the flame, without producing that horrible smoke which rises from it when the engines begin to play, but when once wetted, they would retard the evaporation of the water, which is almost instantaneous when the fire has made considerable progress. It would afford me sincere satisfaction were this observation to be thought worthy the attention of those, who, from their experience and their sagacity, are capable of giving it all the utility of which it is susceptible

ng of certain white quadrupeds of the Island of Ceylon, says that their skin is perfectly black. I myself recollect to have seen at Port l'Orient a cockatoo, which had been stripped of the feathers on the breast, where the skin was as black as that of a negro. When this white bird, with his black bill and his black and naked breast, erected his tuft and clapped his wings, he had the appearance of an Indian monarch with his crown and mantle of feathers.

This law of compensations has, therefore, means, infinitely varied, which overthrow most of the laws we have established in physics; but it must itself be subjected to the general accommodation. If, regardless, of this last, we were to attempt to render it universal, it would infallibly lead us into the common error. It has given rise, in geometry, to several axioms, extremely doubtful, though highlly celebrated, such as the following: "The action is equal to the re-action—or this other, which is a consequence of the former: "The angle of reflection is equal to the angle of incidence." I shall not demonstrate in how many cases these axioms are erroneous, how many actions in Nature are without re-actions, how many actions have unequal re-actions, how many angles of reflection are deranged by the very planes of incidence. It is sufficient for me to repeat here what I have several times observed, namely, that the weakness of the human mind, and the vanity of our education, incessantly incline us to generalize. This method is the cause of all our errors, and perhaps of all our vices. Nature has conferred on each creature all that is most perfectly adapted to its wants, according to the latitude for which it is destined; and when the seasons vary the temperature of that latitude, she likewise varies the adaptations. Some of these adaptations, therefore, are immutable, and others are changeable.

Nature often employs contrary means to produce the same effect. She makes glass with fire; she forms it too with water, as crystal; she likewise produces it from the organization of animals, such as certain shell-fish, which

are transparent. She forms the diamond by a process with which we are entirely unacquainted. Now conclude, that, because a substance is vitrified, it is the effect of fire, and build on this principle the system of the world! Nay, even in the existence of beings, we can do nothing more than seize harmonic instants. That which is vitrifiable, becomes calcareous; and that which is calcareous, is converted into glass by the action of fire. Deduce, then, from these simple modifications of the fossil kingdom constant characteristics for distinguishing its general classes!

Often, too, does Nature employ the same medium to produce effects diametrically opposite. We have seen, for example, that to increase the heat in the regions of the north, and to weaken it in those of the south, she makes use of opposite colors; she produces the same effects by strewing rocks over the one and the other. These rocks are highly necessary to vegetation. In those of Finland I have frequently observed verdant selvages skirting their bases toward the south; and in those of the Isle of France, I have found these borders on the side that is shaded from the sun.

The same observations may be made in our own climates. In summer, when the ground is parched, we often find green herbage at the foot of walls that have a northern aspect: it disappears in winter, but we then discover it along such as are exposed to the south. We have likewise remarked, that the icy zones and the torrid zone contain the greatest quantity of waters, whose evaporations moderate alike the intense heat and the intense cold, with this difference, that the most extensive lakes are situated toward the poles, and the largest rivers are found near the Line. There are, it is true, some lakes in the interior of Africa and America, but they are placed in elevated atmospheres, in the centre of mountains, where they cannot be corrupted by the action of the heat: but the plains and low grounds are washed by the greatest currents of fresh water in the world, such as the Zaira, the Senegal, the Nile, the

Meschasebe, the Oronoko, the Amazons, and others. Nature universally proposes to herself no other end than the accommodation of her creatures. This remark is of the utmost importance in the study of her works; otherwise, from the similitude of the means she employs, or from their exceptions, we might be led to doubt the constancy of her laws, instead of ascribing their majestic obscurity to the multiplicity of her resources, and to the profundity of our ignorance.

This law of adaptation has been the source of all our discoveries. It was this that conducted Christopher Columbus to America, because, as we are informed by Herrera, he thought, in opposition to the opinion of the ancients, that the five zones must be inhabited, since God had not formed the earth for a desert. It is this that governs our ideas concerning objects, absolutely beyond our examination; and by this, though we are ignorant whether there are human beings in the planets, we are convinced there must be eyes, because there is light in them. It is this that excited a sense of justice in the heart of every man, and has informed him that there is another order of things after this life. Finally, it is the strongest proof of the existence of God; for amid a multitude of adaptations, so ingenious that even our restless passions could never have devised any thing similar, and so numerous that every day presents us with new ones, the first of all, which is the Deity, must undoubtedly exist, since he is the general point of conformity in which all particular conformities are concentrated.

This it is, above all, whose existence we are desirous to discover and ascertain in every possible manner. For this reason the most copious collections of natural history galleries of the most admired pictures, gardens filled with the most curious plants, books that display the most sublime productions of genius, in a word, all that presents to us the most marvellous relations of Nature, after they have excited within us enthusiastic admiration, never fail, at last,

to produce languor and fatigue. We often prefer to them a rustic mountain, a rugged rock, some wild solitude, that might afford us new and still more direct relations. On leaving the magnificent Cabinet of Natural History, belonging to the Garden of Plants, we often stop mechanically to look at a gardener digging a hole in the ground with his spade, or at a carpenter cutting a piece of wood with his hatchet, as if we expected to behold some new harmonies start from the bosom of the earth, or from the trunk of an oak. We set no value on those we have just seen, if they fail to lead us to others to which we were strangers. But were we even to possess a complete history of the stars of the firmament, and of the invisible planets that surround them, on perceiving a multitude of ineffable plans of intelligence and of goodness, our hearts would still sigh for something more. Their only end is the Deity himself.

STUDY XI.

APPLICATIONS OF SOME GENERAL LAWS OF NATURE TO PLANTS.

Before I proceed to treat of plants, I shall indulge in a few reflections on the language of botany.

We are still so young in the study of Nature, that our languages want terms for expressing her most common harmonies. This is so true, that however accurate may be the descriptions of plants, composed by botanists of the highest abilities, it is impossible to recognize them in the fields, if you have not previously seen them in Nature, or at least in a herbary. Those who imagine that they possess the most profound knowledge of botany,

need only to attempt to draw upon paper a plant which they have never seen, after an accurate description of the greatest masters, and they will find how widely their copy will deviate from the original. Men of genius have, however, taken extraordinary pains to give characteristic names to the various parts of plants: most of these names they have even borrowed from the Greek, a language which possesses such energy of expression. From this practice has resulted another inconvenience, namely, that these names, which are in general compounds, cannot be rendered into any modern language; and this is one of the reasons why a great portion of the works of Linnæus are not susceptible of translation. These scientific and mysterious expressions diffuse, it is true, a venerable air over the study of botany; but Nature has no need of these resources of the human heart to command our respect. The sublimity of her laws may dispense with the emphasis and obscurity of our expressions. The more intimately we are acquainted with her, the more profound is our admiration of her productions.

After all, most of these foreign names, employed particularly by the herd of botanists, fail to express even the most common characters of vegetables. They frequently make use, for example, of these vague expressions, *suave rubente, suave olente*, of an agreeable red, of a sweet smell, to characterize flowers, without expressing even the shade of that red, or the species of that perfume. They are still more embarrassed to convey an idea of the dusky colors of their stems, roots, or fruits; they say *atro-rubente, fusco-nigrescente*, of a dark red, of a dusky brown. With regard to the forms of vegetables the case is still worse, though they have manufactured terms composed of four or five Greek words to describe them.

J. J. Rousseau, one day communicated to me a kind of Algebraic characters, which he had invented for the purpose of expressing very briefly the colors and forms of vegetables. Some represented the forms of the flowers,

others those of the leaves, and others those of the fruits. One was in the form of a heart, another was triangular, and a third was shaped like a lozenge. He employed no more than nine or ten of these signs to compose the description of a plant. Some were placed over others with cyphers indicating the genera and species of plants, so that you would have taken them for the terms of an algebraic formula. However ingenious and expeditious this method might be, he told me he had relinquished it because it exhibited nothing but skeletons. This sentiment came with peculiar grace from a man whose taste was equal to his genius, and is capable of suggesting some reflections to those who are desirous of giving abridgments of every thing, and in particular of the works of Nature. The idea of Jean Jacques, however, deserves to be followed up, were it even of no other use than to lead, one day, to the formation of an alphabet proper to express the language of Nature. To describe all the shades of colors, and all the modifications of tastes, of perfumes, and of forms, nothing more would be necessary than the introduction of accents. But still these characters could not be rendered with precision, unless the qualities of each vegetable were first accurately defined in words; otherwise, the language of botanists, which is now accused of speaking only to the ear, would then be intelligible only to the eye.

This is what I have to propose on a subject so interesting, and which will coincide with the general principles we shall afterwards lay down. The little I shall advance upon it may serve to supply expressions, not only in botany and in the study of the other natural sciences, but in all the arts where we find ourselves every moment at a loss for terms to describe the tints and forms of objects.

Though we have only the single term *white*, to express the colour which is thus denominated, Nature presents us a great variety of sorts of it. In this particular, painting is as barren as language.

I have heard of a celebrated painter of Italy, who once

found himself greatly embarrassed to paint in one of his pieces, three figures dressed in white. The difficulty was, how to give effect to these figures, thus uniformly dressed, and how to produce different shades from a color the most simple and the least compounded of all. This he was ready to consider as utterly impossible, when, passing through a corn-market, he perceived the effect which he wanted. It was a group formed by three millers, one of whom was under a tree, the second in the half tint of the shade of the tree, and the third in the sun-shine; so that though all three were dressed in white, there was however a considerable difference between them. He, therefore, painted a tree in the midst of the three figures of his picture, and by placing one of them in the rays of the sun, and covering the two others with different tints of shade, he was enabled to give three several casts of white to their drapery. This, in fact, was rather to evade the difficulty than to resolve it: and such is the actual practice of painters in similar cases. They diversify their whites with shades, half-tints, and reflections; but these whites are never pure, being always clouded with yellow, blue, green, or grey. Nature employs several species of white without diminishing its purity by dotting, shagreening, radiating, varnishing, and so forth. Thus the whites of the lily, the daisy, the lily of the valley, the narcissus, the wild anemone, the hyacinth, are all different from each other. The white of the hyacinth, is like the color of ivory, and that of the lily, semi-transparent and crystalline, resembles the paste of porcelain. I therefore imagine, that all the whites produced by Nature, or by art, may be found in those of the petals of our flowers, and that we accordingly possess in vegetables a scale of shades of the purest white.

We might, in like manner, procure all the pure and imaginable tints of yellow, of red, of blue, from the flowers of the jonquil, the crocus, the butterflower, the rose, the poppy, the corn-bottle, the larkspur. Among our flowers

we might likewise find every compound color, such as that of the impurpled violet and fox-glove, which are formed of the different harmonies of red and blue. The single color, composed of blue and yellow, which forms the green of our herbage, is so varied in our fields, that each plant may be said to have its peculiar tint of that color. I have no doubt that Nature has displayed in equal variety the other colors of her pallet, in the bosom of the flowers, or on the surface of fruits. There she often employs very different hues without intermixing them, but she lays them one upon another in such a manner as to resemble the color of the pigeon's neck; such are the beautiful tints exhibited by the corrolla of the anemone. In others she glazes the surface, as certain mosses with a green ground, which are tinged with purple; she clothes others with velvet, as the pansy. She powders fruits with a delicate flour, as the purple plumb, called *Monneur*, or covers them with light down, to soften their vermilion, as the peach, or smooths their skin, and gives to their colors the most brilliant lustre, as the golden rennet.

What most embarrasses naturalists in the denomination of colors, is to find epithets for such as are dusky; or rather this gives them no manner of concern. They extricate themselves from the difficulty by means of vague and indeterminate expressions, as blackish, grey, ash-colored, brown, which they render, it is true, in Greek or Latin words. But these words frequently serve only to confound their images, as they convey no idea whatever; for what, seriously, can be meant by such epithets as *atro-purpurente*, *fusco-nigrescente*, which they so often employ?

It is possible to produce thousands of tints, widely different from each other, to which these general expressions might apply. As these dark hues are, in fact, much compounded, it is extremely difficult to characterize them with the expressions of our ordinary nomenclature. But this might be easily accomplished by referring them to the different colors of our domestic vegetables. In the barks

of our trees and of our shrubs, in the capsules and shells of their fruits, as well as in the withered leaves, I have observed an incredible variety of these dull and gloomy colors, from yellow to black, with all the mixtures and additions of other colors. Thus, instead of saying in Latin, a yellow inclining to black, or an ash-color, to denote some particular shade in Nature or art, we might say, a yellow like the color of a dried walnut, or a grey resembling the bark of the beech. These expressions would be so much the more accurate, as Nature invariably employs these kinds of hues in vegetables, as distinguishing characteristics and signs of maturity, vigor, or decay, and as our peasants know the different kinds of wood in our forests, by the mere inspection of the bark. Thus not only botany, but all the arts, might find in vegetables an inexhaustible vocabulary of unchanging colors, which would not be embarrassed with compound, barbarous, and technical terms, but which would be continually presenting new images New charms would be diffused over our books of science, which would be embellished with comparisons and expressions borrowed from the loveliest kingdom of Nature. Of this the great poets of antiquity did not fail to avail themselves, for they assimilated to it most of the events of human life. Thus Homer compares the floating generations of men to the leaves which drop from the trees of the forest at the end of autumn; the glow of beauty to that of the rose; and the paleness which overspreads the face of a youthful warrior, mortally wounded in battle, as well as the attitude of his drooping head, to the color and fading of a lily, whose root has been cut by the plough. But we are satisfied with repeating the expressions of men of genius, instead of attempting to tread in their steps. Nay, what is still worse, most naturalists look upon the colors themselves of vegetables as merely accidental. We shall soon see how great is their mistake, and how widely they have deviated from the sublime plans of Nature in prosecuting their mechanical methods.

It is possible, in like manner, to approximate the tastes and smells of every kind and of every country to those of the plants of our gardens and of our fields. The ranunculus of our meadows has the acrimony of the pepper of Java. The root of the carnation, called caryophyllata, and the flowers of our pinks, have the smell of the clove of Amboyna. As to compound smells and tastes, they may be compared to such as are simple, the elements of which Nature has placed in every climate, and which she has united in the vegetables tribes. I know a species of morel, which is used as food by the Indians, and, when dressed, has the smell of beef. They call it *brette*. We have a kind of crane's-bill, the leaves of which smell like roasted mutton. The muscari, a species of small hyacinth, which grows beneath our bushes at the beginning of spring, has a very strong smell of plumbs. Its little, light blue, monopetalous flowers, without lips or incisions, have likewise the form of that fruit. It is by comparisons of this nature, that the English writer Dampier and Father du Tertre have given us, in my opinion, the most correct ideas of the fruits and flowers that grow between the tropics, by referring them to the fruits and flowers of our own climates. Dampier, for example, to describe the banana, compares it, when stripped of its thick and pentagonal skin, to a large sausage, its substance and its color to that of fresh butter in winter, its taste to a mixture of the apple and the bergamot pear, which melts in the mouth like marmalade. When this traveller is describing some good fruit of the Indies, he makes your mouth water. He possesses a naturally sound understanding, superior both to the methods of the learned, and the prejudices of the vulgar He maintains, for instance, and with justice, in opposition to the general opinion of navigators, that the banana is the king of fruits, without excepting even the cocoa. He informs us that this is also the opinion of the Spaniards, and that multitudes of families subsist, between the tropics, on this pleasant, wholesome, and nourishing fruit, which lasts

all the year round, and requires no culinary preparation. Father du Tertre is not less happy or less accurate in his botanical descriptions.* These two travellers convey at once, by the aid of trivial similes, an accurate idea of a foreign vegetable, which you will seek in vain in the Greek epithets of our ablest botanists. This manner of describing Nature, by common images and sensations, is despised by our men of learning; but I consider it as the only medium of producing pictures resembling the originals, and as the true character of genius. By means of it you are enabled to paint all the objects of Nature, and to dispense with systematic methods, without it you only fabricate phrases.

Let us now proceed to make some observations on the forms of vegetables: in this particular the language of botany, and even that of the other arts, is exceedingly barren. Geometry, whose peculiar study it is, has not calculated more than a dozen regular curves, which are known only to a small number of the learned, whereas Nature employs an infinite multitude of them in the forms alone of flowers. Some of their uses we shall presently point out. It is far from being my intention to make a study replete with delight, a sublime science worthy only of a Newton. As Nature has conferred, in my opinion, not only all the colors, tastes, and perfumes, but likewise every possible form on the leaves, flowers, and fruits of every climate, either in the trees or in the herbage and mosses, the vegetable forms of the other parts of the world might be compared to those of our own country which are most familiar to us. These approximations would be much more intelligible than our compound Greek words, and would unfold new relations in the different classes

* The same observation applies to his descriptions of animals. He begins his account of the land-crab in the following manner:—"The whole body of this animal has the appearance of being composed merely of two hands cut off in the middle and joined together again; for on each side you see the four fingers and the two nippers, which serve instead of thumbs."

of the same kingdom. They would be equally necessary for explaining the aggregations of the flowers on their stems, of the stems around the root, and of the groups of young plants about the principal stock. It may be affirmed that names are still invented for most of these vegetable aggregations and dispositions; for the greatest masters have not been happy in characterizing them, or, to speak plainly, have not bestowed any attention on the subject. Tournefort, for example, speaking in his voyage to the Levant of a heliotrope, or sun-flower of the Island of Naxos, which he thus characterizes: *Heliotropum humifusum, flore minimo, semine magno*, the creeping heliotrope, with a very small flower and large seed, says, "that its flowers are disposed in the form of an ear of corn, ending in a scorpion's tail." In this description there are two mistakes; for the flowers of this plant, resembling in their aggregations those of the heliotrope of our climates and of Peru, are not disposed in the form of an ear of corn, since they are arranged only on one side of a horizontal stem, and bend downward like the tail of a snail, and not upward, like that of a scorpion. The same inaccuracy of imagery occurs in the description he gives us of the *Stachis Cretica latifolia*, the broad-leaved Stachis of Crete. "Its flowers," says he, "are disposed in rings." No one would imagine he intended to convey the idea that they are disposed like the divisions of the king of a chessboard. It is, however, in this form that they are represented in the drawing of Aubriet, his designer. I know of no botanical expression descriptive of this character of spherical aggregations, separated by alternate projections and vacuities, and terminating in a pyramid. Barbeu du Bourg, who possesses much imagination with little accuracy, calls this form verticillated, for what reason I know not. If it be from the Latin *vertex*, a head or summit, because these flowers, thus aggregated, form several summits, this denomination would be more applicable to various other plants; and, besides, it is not expressive of the sink

ings, the projections, and the progressive diminution of the flowers of the stachis. Tournefort derives it from the Latin word *verticillus*, "that is," he says, "a little perforated weight, fastened to the end of a spindle to make it turn with greater facility." This is going very far to seek an extremely imperfect resemblance to an implement by no means generally known. In saying this, I have no intention of violating that respect which is due to such a man as Tournefort, who first cleared the path of botanical research, and who likewise possessed profound erudition. But, from this negligence of the greatest masters, we may conceive how many vague, inaccurate, and incoherent expressions are accumulated in the nomenclature of botany, and what obscurity they must diffuse over its descriptions.

After all, some one may ask, how are we to characterize the aggregations of the flowers of the two abovementioned plants? By comparing them to similar aggregations in the plants of our climates. This cannot be attended with any difficulty: the assemblage of the flowers of the Greek heliotrope might, for example, be referred to that of the flowers of the French or Peruvian heliotrope; and the aggregation of the flowers of the Cretan stachis, to that of the flowers of the horehound or pennyroyal. To this might afterwards be added the differences in color, smell, taste, which diversify the species of it. There is no necessity to compound foreign words in order to describe forms that are familiar to us. Nay, I defy any one to convey, with Greek or Latin words, and the most learned paraphrases, an idea of the simple color of the bark of a tree. But if you tell me it resembles that of an oak, I know its hue at once.

These approximations of plants are attended with this farther important utility, that they exhibit a complete resemblance of the unknown object, without which it is impossible to form any determinate idea of it. One of the defects of botany is, that it presents us the characters of vegetables only in succession: it does not collect them,

but it decomposes them. It refers them indeed to a classical order, but not to an individual order. This is, however, the only one that the weakness of the human mind permits us to embrace. We love order, because we are feeble, and the least confusion disturbs us. Now there is no order more easily adopted than that which resembles an order which is familiar to us, and which Nature every where presents us. Try to describe a man feature by feature, member by member, be ever so exact, and yet you will never give me his portrait: but if you compare him to some person that I know, if you tell me, for instance, that he has the figure and air of Don Quixotte, or a nose like that of St. Charles Borromeo, you may paint his picture in four words. It is by the whole of any object that the ignorant, an epithet including almost all mankind, first endeavour to make themselves acquainted with it.

It would, therefore, be essential to have in botany an alphabet in colors, tastes, smells, forms, and aggregations, borrowed from our most common plants. These elementary characters would enable us to express ourselves with precision in all the parts of natural history, and would present to us new and curious relations.

In the hope that persons of superior ability will hereafter devote their attention to this subject, we shall enter upon it, notwithstanding the embarrassment of language.

When we behold a multitude of plants of different forms vegetating on the same soil, we are inclined to believe that those of the same climate grow indiscriminately in every situation. But those only that spring up in places particularly assigned them by Nature attain all the perfection of which they are susceptible. The same observation applies to animals: goats are bred in marshy countries, and ducks upon mountains; but the goat will never acquire, in Holland, the beauty of that which Nature clothes with silk on the rocks of Angora; nor will the duck of Angora ever have the size and the colors of that which is seen dabbling in the canals of Holland.

If we cast but a single glance on plants, we shall perceive that they have relations to the elements which promote their growth; that they have relations to each other by the groups which they form; that they have relations to the animals whom they supply with food; and, finally, that they have relations to man, who is the centre of all the works of the creation. These relations I call harmonies, and I divide them into elementary, into animal, into vegetable, and into human. By this division I shall establish something like order in the examination I am about to undertake. It may easily be imagined that I shall not consider them in detail; the plants of a single species would furnish speculations which a whole world would be incapable of exhausting: but I shall enlarge sufficiently on their general harmonies to convince the reader that infinite intelligence pervades this lovely portion of creation, as well as the rest of the universe. We shall thus apply the laws which have been previously established, and we shall obtain a glimpse of a multitude of others equally worthy of our researches and of our admiration. Be not astonished, reader, at their number, or at their extent. Let this truth, that God hath made nothing in vain, be deeply impressed on your heart. A scholar, with his systems, is stopped short in Nature, at every step; the most ignorant is enabled with this key to open all her doors.

ELEMENTARY HARMONIES OF PLANTS.

Plants have the same number of principal parts as there are elements with which they maintain relations. By their flowers they have relations with the sun, which fecundates and ripens their seed, by their leaves with the waters which bedew them, by their roots with the earth which produces them, and by their seeds with the situations in which they are destined to grow. Not that these principal parts have no indirect relations with the other

elements, but it will be sufficient for our purpose to consider such as are immediate.

ELEMENTARY HARMONIES OF PLANTS WITH THE SUN, BY THE FLOWERS.

THOUGH botanists have made great and laborious researches respecting plants, they never devoted their attention to any of these relations. Fettered by their systems, they have particularly confined themselves to the consideration of the flowers, and have placed those that exhibited any external resemblances in the same class, without even enquiring what might be the peculiar purpose of the various parts composing the flower. They have, it is true, discovered that the stamina, the antheræ, and the stigmata are subservient to the fecundation of the fruit; but excepting this, and some other particulars relative to the interior organization, they have either overlooked or mistaken the relations which the whole plant has with the rest of Nature.

This partial division has led them into the strangest confusion; for, by considering the flowers as the principal characters of vegetation, and including in the same class all those which bear some resemblance to each other, they have coupled together plants of a nature totally foreign, and, on the contrary, have separated others which were evidently of the same genus. Such is, in the first instance, the thistle called *dipsacus*, which they class with the scabiosa, on account of the similarity of some parts of its flower, though its branches, its leaves, its smell, its seed, its thorns, and its other qualities proclaim it to be a real thistle: and such is, in the second place, the Indian chesnut, which they do not include in the class of chesnut trees, because it has different flowers. To class plants, by the flowers, that is by the parts of fecundation, is the same thing as classing animals by those of generation.

However, though they have referred the character of

plant to its flower, they have misunderstood the use of its most distinguished part, which is the corolla. What we denominate the leaves of a flower, they call the *corolla*, because those leaves are disposed in the form of small crowns in a great number of species; and they have given the name of petals to the divisions of that crown. Some have indeed discovered that it is adapted for covering the parts of fecundation, before the expansion of the flower; but its calix is much better fitted for that purpose, from its thickness, its beards, and sometimes from the prickles with which it is furnished. Besides, when the corolla leaves the stamina exposed, and continues expanded for whole weeks, it must of necessity be serving some other purpose, for Nature has made nothing in vain.

The corolla seems to be intended to reverberate the rays of the sun on the parts of fecundation, and we shall have no room for doubt on this subject, if we consider its color and form in most flowers. We observed, in the preceding Study, that, of all colors, white is the best adapted for reflecting heat: now, it is this in general that Nature bestows on flowers which blow in cold seasons and situations, as we see in the snow-drop, the lily of the valley, the hyacinth, the narcissus, the wild anemone, which blossom early in the spring. Under this color must likewise be classed those that have faint tints of rose or azure, as various species of hyacinths, and also such as have yellow and brilliant hues, as the flowers of the dandelion, the butter-flower, and the wall-flower. But such as blow in warm seasons and situations, like the poppy, the corn-flower, which grow in summer among the corn, have dark colors, as purple, deep red, and blue, which absorb heat without much reflecting it. I do not know, however, that there is no flower perfectly black; for if there were, its petals, being incapable of reflection, would be totally useless. In general, of whatever color a flower may be, the lower part of its coralla, which reflects the rays of the sun, is of a much paler tint than the other. It

is even so remarkable, that botanists, most of whom consider the color of flowers as purely accidental, distinguish it by the name of *unguiculus*. This unguicle is, with respect to the flower, what the belly is to animals; its color is almost always lighter than that of the rest of the petal.

The forms of flowers are not less adapted than their colors to reflect heat. Their corollæ, divided into petals, are absolutely an assemblage of mirrors, directed to one focus. Of these they have sometimes four, which are plain, as the flower of the colewort in the cruciform; or an entire circle, as the daisy, in the radiated; or portions of a sphere, as the rose; or perfect spheres, as the bells of the lily of the valley; or truncated cones, as the fox-glove, the corolla of which is formed like a thimble. At the focuses of these plain, spherical, elliptical, parabolic, and other mirrors, Nature has placed the parts of fecundation of plants, as she has placed those of generation in animals in the warmest parts of their bodies. These curves, which geometricians have not yet examined, are worthy of the most profound investigation. It is truly astonishing, that they should have taken so much pains to invent curves, imaginary and frequently useless, and that they should have neglected to study those which Nature employs with such regularity and variety in an infinite multitude of objects. Be this as it may, botanists have given themselves still less concern on this subject. They comprise those of flowers under a small number of classes, without paying attention to their use, or even so much as suspecting it. They take notice only of the division of their petals, which often produces not the slightest change in the configuration of their curves, and frequently class under the same name such as are the most opposite. Thus under the denomination of monopetalous, they include the spheriod of the lily of the valley and the trumpet of the convolvulus.

On this subject we shall notice a very remarkable

circumstance. It is this, that frequently such as is the curve formed by the border or upper extremity of the petal, such is that of the plan of the petal itself, so that Nature presents us the section of each flower in the contour of its petals, and gives us at the same time its plan and its elevation. Thus in the rose and all the tribes allied to it, the borders of the petals form portions of circles, like the curve of the flower itself: the carnation and the corn-bottle, whose edges are indented, have the planes of their flowers folded over each other like fans, and form a multitude of focuses. For want of a real flower, these curious remarks may be confirmed by the drawings of artists, who have copied plants with the greatest accuracy, but who, indeed, are very few in number. Such, among others, is Aubriet, who made the designs of those in Tournefort's Voyage to the Levant, with the taste of a painter, and the precision of a botanists. We shall there find a confirmation of what I have just been advancing. For example, the *scorzonera Græca euxatilis et maritima, foliis variè laciniatis*, (the Greek saxatile and marine scorzonera, with leaves cut in various figures,) which is represented in that work, has its petals, or half-flowers, squared at the end, and plane on the surface. The flower of the *stachis Cretica latifolia*, (the broad leaved stachis of Crete,) which is a monopetalous, tubular plant, has the upper part of its corolla undulated as well as its tube. The *campanula Græca, saxatilis jacobeæ foliis*, (the Greek campanula of the rocks, with rag wort leaves,) exhibits these consonances in a manner still more striking. This campanula, which Tournefort considers as the most beautiful he ever saw, and which he sowed in the Garden of Plants at Paris, where it grew very well, is of a pentagonal form. Each of its planes is composed of two portions of a circle, whose focuses undoubtedly meet on the same anthera; and the border of this campanula is cut into five parts, each of which is shaped like a Gothic arch, as is each face of the flower. Thus in order to

discover at once the curve of a flower, it is sufficient to examine the brim of its petal. It is of much utility to bear in mind this observation, for it would otherwise be extremely difficult to determine the focuses of the petals; besides, flowers lose their internal curves in herbaries. These consonances I believe to be general; I would not, however, venture to assert that they are without exception. It is possible that Nature may deviate from them in some species, for reasons of which I am ignorant. It cannot be too often repeated, that she has no other general and invariable law than the accommodation of created beings. The relations we have just stated between the curve of the edges and that of the petals, appear to be founded on this universal law, since they present conformities so pleasing in their combination.

The petals seem to be so expressly intended to warm the parts of fecundation, that Nature has placed a circle of them around most compound flowers, which are themselves aggregations of an infinite number of small tubes, which form so many distinct flowers, or, if you please, flowerets. This may be observed, in the petals that surround the disks of the daisy and the sun-flower. They may likewise be perceived in most umbelliferous plants; though each floweret composing them has its particular petals, yet a circle of others, still larger, incloses their assemblage, as you may see in the flowers of the daucus.

Nature has still other means of multiplying the reflections of heat in flowers. Sometimes she places them on stems of little elevation, that they may receive warmth from the reflections of the earth; sometimes she glazes them with a brilliant varnish, as in the yellow ranunculus of the meadow, vulgarly denominated the butterflower.. Sometimes she withholds the corolla, and causes the parts of fecundation to issue from the sides of an ear, from a cone, or from the branch of a tree. The forms of an ear and of a cone, appear the most proper for reverberating on them the action of the sun, and for ensuring their fructification;

for they always afford them some side sheltered from the cold. Nay, it is very remarkable that the aggregation of flowers in a cone, or in an ear, is very common to the herbs and trees of the north, and extremely rare in those of the south. Most of the gramineous plants that I have seen in southern regions, do not carry their grains in an ear, but in flowing tufts, divided into a multitude of distinct stems, as millet and rice. Maize, or Turkey corn, has, it is true, a large ear, but that ear is, for a considerable time, enclosed in a bag, and on bursting from it, shoots forth, above its head, a long plume, which seems solely intended to shade its flowers from the sun. Finally, what confirms the idea that the flowers of plants are adapted to the action of heat according to the climate, is this, that many of our European plants, though they thrive very well in the Antilles, never produce seed there. Father de Tertre observed in those islands that the cabbage, the saintfoin, the savory, the sweet basil, the nettle, the plantain, the wormwood, the sage, the liverwort, the amaranth, and all our species of gramineous plants grew there wonderfully well, but never yielded any seed. These observations prove that it is neither the air nor the soil that is inimical to them, but the sun, which acts too powerfully on their flowers: for most of these plants have theirs aggregated into ears, which greatly increase the repercussion of the solar rays. I, nevertheless, believe, that it would be possible to naturalize them in those islands, as well as many other vegetables of our temperate climates, by selecting from among the varieties of their species those whose flowers have the smallest fields, and whose colors are the darkest, or such as are composed of divergent rays.

Not that Nature possesses no other resources for producing plants of the same genus in different seasons and climates. She renders their flowers susceptible of reflecting heat under different degrees of latitude, without scarcely any alteration in their form. Sometimes she

mounts them upon elevated stems, to raise them above the reflection of the soil. It is for this reason that she has placed between the tropics most of the apparent flowers upon trees. In those regions I have seen very few in the meadows, but a great number in the forests. There you are obliged to look aloft to discover flowers, here you must cast your eyes on the ground, for with us they grow only among the grass and on shrubs. Sometimes she expands them beneath the shade of the leaves; such are those of the palm, and of the banana, which grow close to the trunk of the tree. Such are, likewise, in our climates, those large white bell-shaped flowers, known by the name of Lady's-smocks, which delight in the shade of the willow. There are others, of the same kind, such as most of the convolvuluses, which open only in the night; others grow exposed on the ground, as the pansy, but they have their dark and tufted pavilions. There are some that receive the action of the sun, when at his full elevation, as the tulip; but Nature has taken the precaution to bring forth this large flower only in the spring, to paint its petals with dark colors, and to daub the bottom of its cup with black.* Others are disposed in girandoles, and

* This flower, from its color, is in Persia the emblem of perfect lovers. Chardin relates, that when a young man, in Persia, presents a tulip to his mistress, he means to convey to her the idea, that, like this flower, his face is on fire, and his heart reduced to a coal. There is no work of Nature which does not excite in man some moral affection. The habits of society at length divest us of this sentiment, but it is still found among those nations who live near to Nature. Various alphabets were invented in China, in the early ages, after the wings of birds, fishes, shells, and flowers: of these very curious characters may be seen in the *China Illustrated* of Father Kircher. It is in consequence of these natural manners, that the Orientals employ so many similes and comparisons in their languages. Though our metaphysical eloquence derives but little advantage from them, they, nevertheless, produce striking effects. J. J. Rousseau has taken notice of that which was addressed to Darius by the ambassador of the Scythians, who, without uttering a word, presented to him a bird, a frog, a mouse, and five arrows, by which that high-spirited people intended to convey this bold defiance: "Unless you can fly like a bird, swim like a frog, or dig like a mouse, you shall not escape our arrows." Herodotus informs us, that the same Darius sent word to the Greeks of Ionia, who were ravaging his coasts, that if they did not desist from their depredations, he would treat them like pines. The Greeks, who began to make pretensions to wit, and to lose sight of Nature, could not comprehend the signification

receive the effect of the solar rays only under one point of the compass. Such is the girandole of the lilach, which, turning a different face towards the east, south, west, and north, presents, in the same cluster, flowers in bud, half open, expanded, and all the charming hues of the blossom.

There are flowers, such as the compound, which, being in a horizontal situation, and completely exposed, behold the sun, like the horizon itself, from his rising to his setting; such is the flower of the dandelion. But it possesses a very extraordinary method of sheltering itself from heat; it closes whenever it becomes too powerful. It has been observed that it opens in summer at half past five in the morning, and contracts its petals towards the centre at nine o'clock. The flower of the lettuce, which, on the contrary, is on a vertical plane, opens at seven and shuts at ten. It was by means of a series of observations like these, that the celebrated Linnæus formed a botanical time-piece; for he had discovered plants which opened at every hour of the day and of the night. In the Garden of Plants is cultivated a species of serpentine aloe, without thorns, whose large and beautiful flower emits a strong smell of vanilla, at the time of its expansion, which is extremely short. It blows only about the month of July, at five in the evening; you then see it gradually open its petals, expand itself, and die. By ten at night is is totally faded, to the great astonishment of the spectators, who flock in crowds to see it, for nothing but what is rare excites admiration. The flower of our common thorn, (I do not mean the white thorn,) is still more extraordinary, for it flowers so rapidly, that there is scarcely time to observe its expansion.

All these observations clearly demonstrate the relations of the corollæ to heat. I shall add one more, which

of this message. They found, at length, that Darius meant to intimate that he would utterly exterminate them, because the pine-tree, after being once cut down, never shoots again.

evidently proves their use. It is this: that the time of their duration is regulated by the quantity of heat they are intended to collect. The hotter the season is, the shorter is their duration. Almost all fade as soon as the plant is fecundated.

But if Nature withdraws the greatest number of flowers from the too violent action of the sun, she destines others to appear in all the splendor of his rays, without sustaining any injury. To the former she has given dusky reverberators, or such as can close, as occasion requires; and on the others she has bestowed parasols. Such is the crown imperial, whose flowers, like inverted bells, grow amid the shade of a tuft of leaves. The chrysanthemum peruvianum, or, to employ a more simple denomination, the sun-flower, which turns incessantly towards the orb of day, covers itself, like its native land, Peru, with clouds of dew, that cool its flowers during the most intense heat of the day. The white flower of the lychnis, which blows in our fields in summer, and at a distance appears like a cross of Malta, has a species of contraction, or narrow collar placed at its centre, so that its large, shining petals, turned back outwardly, do not act upon its stamina. The white narcissus has, in like manner, a small funnel. But Nature has no occasion to create new parts for the purpose of giving new characters to her works. She produces them at once from existence and from non-existence, and renders them positive or negative at pleasure. She has given curves to most flowers, in order to collect the heat at the centre; she employs the same curves, when she pleases, to dissipate it, and places their focuses externally. It is thus that she has disposed the petals of the lily, which are so many sections of a parabola. Notwithstanding the large size and the whiteness of its cup, the more it is expanded, the more it disperses the heat of the sun; and while, at midsummer, all other flowers, scorched by his noon-tide rays, droop and incline towards the ground, the lily, rearing its head like a king, contemplates face to face, the luminary that blazes aloft in the heavens.

I shall now proceed to refer, in a few words, the positive or negative relations of flowers, with respect to the sun, to the five elementary forms, which I established in the preceding study as the principles of the harmony of bodies. It is not such a plan which I prescribe to botanists, as an invitation to enter on a career so rich in observations, and to correct my errors by communicating the knowledge which they possess.

There are, then, reverberating flowers, perpendicular, conical, spherical, elliptical, parabolic, or plane. To these curves may be referred those of most flowers. There are likewise flowers in the form of a parasol, but those are by far the most numerous; for in every harmony, the negative effects far surpass the positive in number. For example, there is but a single way of coming into life, and there are thousands of going out of it. We shall, however, oppose to each positive relation of flowers to the sun a principle negative relation, to afford an opportunity of comparing their effects in every latitude.

Perpendicular reverberating flowers are such as grow adhering to a cone, in long catkins, or in an ear: such are those of the cedar, of the larch, of the fir, of the birch, of the juniper, of most of the gramineous plants of the north, of the vegetables that grow on cold and lofty mountains, as the cypress and the pine; or of such as flower with us, at the conclusion of winter, as the hazle and the willow. A part of the flowers in this position is sheltered from the north wind, and receives the reflection of the sun on the south side. It is remarkable that all the vegetables which bear cones, catkins, or ears, present them at the extremity of their stems, exposed to all the action of the sun. This is not the case with those that grow between the tropics, most of which, as the palm-tree, bear divergent flowers, attached in pendent clusters, and shaded by their branches. Almost all the gramineous plants of hot countries likewise have divergent ears; such is the millet of Africa. The solid ear of the American maize is

crowned by a tuft, which shelters its flowers from the sun.

Conical reverberating flowers reflect on the parts of florification a complete cone of light. Its action is very powerful; accordingly it is remarkable that Nature has bestowed this configuration of the petal only on the flowers which grow in the shade of trees, as the convolvulus, which climbs round their trunks, and that she has assigned to this flower a very transient duration, for it scarcely exists half a day, and when its fecundation is completed, its border contracts inwardly, and closes up like a purse. Nature has, nevertheless, given it a place in southern latitudes, but she has there painted it with violet and with blue, to weaken the effect. Besides, this flower scarcely ever opens in those regions but in the night. It is, I presume, principally by this nocturnal character, that the convolvulus of hot countries may be distinguished from those of our climates, which blow in the day.

The flowers which partake most of this conical form, are those that grow at the beginning of spring, as the flower of arum, which is shaped like a horn, or those that thrive on lofty mountains, as the auricula of the Alps. When Nature employs it in summer, it is almost always with negative characters, as in the flowers of the fox-glove, which are inclined and dyed a dark red or blue

Spherical reverberating flowers are those whose petals are formed into segments of a circle. It might afford a highly pleasing amusement to consider that these spherical petals have at their focuses the antheræ of the flowers attached to fibres longer or shorter, as the effect intended to be produced may require. It is farther worthy of remark, that each petal has its particular antheræ, or sometimes two, and even as many as three assigned to it; so that the number of petals in a flower almost always exactly divides that of the antheræ. As to the petals, they scarcely ever exceed five in number in the rosiform flowers, as if Nature had thus intended to express the number of the five terms

of elementary progression, of which this beautiful form is the harmonic expression. The flowers with spherical reverberators are very common in our temperate climates, they do not throw back the whole reflection of their disks on the antheræ, as the convolvulus, but only the fifth part, because each of their petals has its particular focus. The rosiform flower is common to most fruit-trees, as the pear, the apple, the peach, the plumb, the apricot, and to a great number of shrubs and herbs, as the white and black thorn, the bramble, the strawberry, the anemone, and others, most of which produce fruits fit for man to eat, and flower in the month of May. Among these may likewise be classed the spheroids, as the lily of the valley. This form, which is the harmonic expression of the five elementary forms, is perfectly adapted to a temperature like ours, which is itself the medium between that of the frigid and that of the torrid zone. As spherical reverberators collect a great quantity of rays at their focuses, their action on that part is very powerful, but it is of short duration. It is well known that nothing fails more quickly than the rose. Rosiform flowers are rare between the tropics, especially such whose petals are white. In those regions they thrive only in the shade of trees. In the Isle of France I have seen many of the inhabitants attempt in vain to raise strawberries; but one of them, who resided, indeed, on an elevated part of the island, found means to procure them in abundance, by planting them under trees in situations only half cleared. To compensate this deficiency, Nature has multiplied papilionaceous, or leguminous flowers in hot countries. The leguminous is directly opposite to the rosiform flower; it has, in general, five rounded petals like the latter; but instead of being arranged about the centre of the flower, in order to reverberate there the rays of the sun, they are, on the contrary, folded inward around the antheræ, for the purpose of sheltering them. You distinguish in them a pavilion, two wings, and a ridge, commonly divided into two, which covers the antheræ and the em-

bryo of the fruit. Accordingly, between the tropics, a great number of trees, shrubs, lianes, and grasses have papilionaceous flowers. All our pease and French beans there thrive wonderfully well, and those countries produce infinite varieties of them. Nay, it is remarkable that our's even delight in sandy soils and hot situations, and flower in the middle of summer. I therefore consider leguminous flowers as of the parasol kind. To these same negative effects of the sun may likewise be ascribed the gullet-like flowers which conceal their antheræ, as the calf's-snout, which delights to grow on the sides of walls.

Elliptical reverberating flowers are such as present the forms of oval cups, narrower at the top than in the middle. It is obvious that this kind of cup, whose perpendicular petals approach each other towards the summit, affords a partial shelter to the bottom of the flower, and that the curves of these same petals, which have several focuses, do not collect the sun's rays towards a single centre; such is the tulip. It is very remarkable that this lengthened form is much more common among flowers in hot countries than that of the rose. The tulip grows spontaneously in the vicinity of Constantinople. Under this form may likewise be included the liliaceous, which are much more common there than elsewhere. However, when Nature employs them in countries still farther towards the south, or in the middle of summer, it is almost always with negative characters; she has accordingly inverted the tulip-shaped flowers of the crown-imperial, a native of Persia, and has shaded them with a tuft of leaves. Thus, in our climates, she bends back externally the petals of the lily; but the species of the white lily that grow between the tropics have, besides, their petals cut out into thongs.

Flowers with parabolic or plane mirrors are such as throw out the rays of the sun in a parallel direction. The configuration of the first gives great lustre to the corollæ of these flowers, which emit, as it were, from their bosom a stream of light, for they collect it at the bottom of their

corollæ, and not on the antheræ. It is perhaps to weaken its action that Nature has terminated these kinds of flowers by a species of cowl, to which botanists have given the appellation of a spur. In this tube probably exists the focus of their parabala, which is perhaps situated, as in many curves of this nature, beyond its summit. Flowers of this sort are frequent between the tropics, such as that of the Antilles, denominated, on account of its beauty, the peacock-flower; and such also is the nasturtium, or nun of Peru. It is even asserted that the perennial species is phosphoric in the night. Flowers with plane mirrors produce the same effect, and Nature has multiplied the models of them in our summer flowers, or such as delight in hot and sandy situations, as the radiated; such are the flowers of the dandelion. They are farther found in the flowers of the doronicum, of the lettuce, of the succory, in asters, in the field-daisy, and others. But she has placed the original pattern of them under the Line, in America, in the large sun-flower which was brought to Europe from Brazil. These being the flowers whose petals have the least action, are likewise those that have the longest duration. These attitudes are varied to infinity; such as are horizontal, as those of the dandelion, close, we are told, towards the middle of the day: it is these that are most exposed to the action of the sun, for they receive his rays from his rising till his setting. There are others which, instead of closing their petals, throw them out, which produces nearly the same effect, such is the flower of camomile. Others are perpendicular to the horizon, as the flower of lettuce. The blue color with which it is tinged, still farther contributes to weaken the rays of the sun, which, in this aspect, would act too powerfully upon it. Others have only four horizontal petals, as the cruciform, the species of which are very common in hot countries. Others bear around their disk flowerets which shadow it: such is the corn-bottle, which blows in the middle of summer.

We have noticed the general forms of flowers, but we should never come to a conclusion were we to enter upon the subject of their different aggregations. I believe, however that they may be referred to the plan itself of flowers Thus the umbelliferous present themselves to the sun under the same aspects as the radiated flowers. We shall merely recapitulate what we have said concerning their mirrors. The perpendicular conical, or ear-formed reverberator collects on the antheræ of the flowers an arch of light of ninety degrees from the zenith to the horizon. It moreover presents, in the inequality of its sides, reflecting surfaces. The conical reverberator collects a cone of light of sixty degrees. The spherical reverberator unites in each of its five petals an arch of light of thirty-six degrees of the sun's course, supposing that luminary to be at the equator. The elliptical reverberator collects a smaller quantity, on account of the perpendicular position of its petals; and the parabolic reverberator, as well as that with plane mirrors, sends back the rays of the sun divergent or parallel. The first form appears very common in the flowers of the frigid zones; the second in those which blow in the shade; the third in temperate latitudes; the fourth in hot countries; and the fifth in the torrid zone. It would likewise appear that Nature multiplies the divisions of their petals, for the purpose of diminishing their action. The convolvulus has only one; rosiform flowers have five; elliptical flowers, as tulips and the liliaceous tribes, have six; those with a plane reverberator, as the radiated, have a great number.

Farther, flowers have parts adapted to the other elements. Some are provided externally with hair to shelter them from the cold. Others are formed to blow on the surface of the water; such are the yellow roses of the of the nymphæ, which float on the lakes, and consign themselves to the different motions of the waves, without being wetted by them, by means of the long and flexible stems to which they are attached. Those of the Valis-

niera are disposed with still greater art. They grow in the Rhone, and would be exposed to inundation by the sudden swellings of that river, had not Nature furnished them with stems resembling a cork-screw, which instantaneously lengthen three or four feet. There are other flowers adapted to the winds and to the rains, as those of pease, which have little boats that shelter the stamina and the embryos of their fruits.* They have, besides, large flags, and are fixed on stalks curved and elastic as a nerve; so that when the wind blows on a field of pease, you see all the flowers turn their backs to the wind, like so many weathercocks. This class appears to be generally dispersed over countries much exposed to the winds. Dampier relates that he found the desert shores of New Guinea covered with pease, bearing red and blue flowers. In our climates the fern, which crowns the summits of hills incessantly battered by the winds and the rain, bears its flowers, turned towards the ground, at the back of its leaves. Nay, there are species of plants whose florification is even adapted to the irregularity of the winds. Such are those of which the male and female individuals grow on separate stems. Tossed hither and thither upon the earth, the powder of the male flowers could fecundate but a very small number of female flowers, if at the season of their blossoming the wind were not to blow from several quarters. How astonishing! that there should be invariable generations founded on the variableness of the winds! From this circumstance I presume that in those countries where the winds blow steadily from the same quarter, as

* I am persuaded that the conformation of most flowers is adapted to the rains, and that it is for this reason many of them have the figures of snouts, or boats, which shelter the parts of fecundation. I have observed that several species of flowers, possess, if I may be allowed the expression, the instinct of closing when the air is damp; such are, among others, the poppy, the anemone, and most of the rosiform flowers, and that rain cuts off a greater quantity of fruit than frost. This observation is of material importance to gardeners, who frequently make the flowers of their strawberry-plants miscarry by watering them. In my opinion, it would be better to water plants in blossom by trenches, after the Indian method than by aspersion.

between the tropics, this species of florification must be extremely rare; and if it be found there at all, it must be regulated precisely by the season in which these regular winds vary.

It is impossible to doubt these admirable relations, however remote they appear, on observing the care with which Nature has preserved the flowers from the shocks they might sustain from the winds themselves on their stems. She envelopes them, in general, in a part which botanists denominate calix. The more branching the plant is, the thicker is the calix of its flower. She sometimes furnishes it with little cushions and with beards, as may be seen in the buds of the rose. Thus the mother puts a pad round the head of her infant, when little, to secure it against the accidents to which it is liable in falling. Nature has so clearly expressed her intention on this subject in branching plants, that she has withheld this case from such as grow on stems that are not branching, and which are in no danger from the agitation of the winds. This may be remarked in the flowers of Solomon's seal, of the lily of the valley, of the hyacinth, of the narcissus, of most of the liliaceous tribes, and of the plants that bear their flowers isolated on perpendicular stems.

Flowers have likewise very curious relations to animals and to man, from the diversity of their configurations and of their smells. That of a species of orchis has the appearance of bugs, and exhales the same disgusting smell. The flower of a species of arum resembles putrid flesh, and has the stench of it to such a degree, that the flesh-fly resorts to it for the purpose of depositing her eggs. But these relations, though very slightly investigated, are foreign to our present subject: it is sufficient for me to have demonstrated that they have relations strongly marked to the elements, and in particular to the sun. When botanists shall have diffused over this branch of natural history all the light they are able, by examining their focuses, their elevation above the ground, the shelter of

reflection they receive from bodies in their vicinity, the variety of their colors, in a word, all the means with which Nature compensates the differences of the exposure, they will no longer doubt these elementary harmonies; they will acknowledge that the flower, so far from presenting an invariable character in plants, exhibits, on the contrary, a perpetual character of variety. It is by this principally that Nature varies the species in the same genus of plant, in order to render it susceptible of fecundation in different sites. For this reason it is that the flowers of the Indian chesnut, a native of Asia, are not the same as those of the European chesnut, and that the flowers of the fuller's thistle, which thrives on the banks of rivers, are different from such as grow on elevated and dry situations.

A very extraordinary observation shall serve to confirm, beyond dispute, all that we have just advanced; it is this, that a plant sometimes totally changes the form of its flowers in the generation which reproduces it. This phenomenon greatly astonished the celebrated Linnæus, the first time it was submitted to his inspection. One of his pupils one day brought him a plant exactly similar to the linarium, with the exception of the flower; the color, the taste, the leaves, the stem, the root, the calix, the pericarpium, and lastly, what is very remarkable, the smell, were perfectly similar, excepting that the flowers were in the shape of a gullet. Linnæus at first imagined that his pupil designed to put his knowledge to the test, by adapting a strange flower to the stem of this plant; but he found that it was a real linarium, whose flower Nature had totally changed. It had been discovered among others in an island seven miles from Upsal, near the sea-shore, on a sandy and gravelly soil. He ascertained that it perpetuated itself in this new state by seed. He afterwards found others in different places; and, what is most extraordinary, there were among them some that bore funnel-formed and gullet-formed flowers on the same stem. To this new vegetable he gave the name of *pelorus*, from the Greek word πελωρ

which signifies prodigy He observed, in the sequel, the same variations in other species of plants, among the rest, in the eriocephalous thistle, the seeds of which every year produce, in the garden of Upsal, the woolly thistle of the Pyrenees. This famous botanist considers these transformations as the effects of a mongrel generation, altered by the fecundating dust of some other neighbouring flower. It may be so; but to this opinion may be opposed the flowers of the pelorus and of the linarium, which he found growing on the same plant. If it was the fecundation which transformed this plant, it ought to have produced the same kind of flowers in the whole individual. Besides, he himself observed that there was no alteration in the other parts of the pelorus, or in its virtues; and this must have been the case, as well as in its flower, had it been produced by the mixture of some strange breed. Lastly, the pelorus propagates itself by seed, which does not take place with any one mongrel species of animals. This sterility in mongrel branches is an effect of the wise consistency of Nature, who cuts off divergent generations, in order to prevent the primordial species from being confounded, and at length disappearing. For the rest, I shall not pretend to examine either the causes or the means which she conceals from me, because they are above my comprehension. I confine my investigations to the ends which she displays, and I am convinced, from the variety of flowers in the same species, and sometimes in the same individual, that they serve sometimes as reverberators, to collect, according to their position, the rays of the sun on the parts of fecundation, at others as parasols to screen them from their heat. Nature acts towards them nearly in the same manner as towards the animals exposed to the same variations of latitude. In Africa she strips the sheep of her wool, and gives her a sleek coat like that of the horse; in the north, on the contrary, she clothes the horse in the woolly fleece of the sheep. I have witnessed this twofold metamorphosis at the Cape of Good Hope and in

Russia. I have seen at Petersburg, Norman and Neapolitan horses, whose naturally short hair was so long and so frizzled in the middle of winter, that you would have believed them to be covered with wool like sheep. It is not then without reason that the old proverb says, "God tempers the wind to the shorn lamb:" and when I behold his paternal hand varying the robe of animals according to the cold, can easily believe that it varies, in like manner, the mirrors of flowers conformably to the sun. Accordingly, flowers may be divided, with relation to the sun, into two classes, into reverberating flowers and flowers with parasols.

If there be any invariable character in plants, it must be sought in the fruit. It is to this that Nature has adapted all the parts of vegetation as to the principal object. This expression of wisdom itself: "By their fruits ye shall know them," is, at least, as applicable to plants as men. We shall therefore examine the general characters of plants, with relation to the places where their seeds are accustomed to grow. As the animal kingdom is divided into three great classes, quadrupeds, birds, and aquatic animals, relatively to the three elements of the globe, we shall, in like manner, divide the vegetable kingdom into aërial or mountain plants, into aquatic, or those of the shores, and into terrestrial, or those of the plains.

But as this last division partakes of the two others, we shall not dwell upon it; for though I am persuaded that every species, nay, even every variety, may be referred to some particular site of the earth, and there grow in its utmost beauty, it is sufficient to say of it here as much as is necessary for the prosperity of a small garden. When we shall have discovered invariable characters in the two extremities of the vegetable kingdom, it will be easy to assign to the intermediate classes those that are adapted to them. We shall begin with the mountain plants.

SEQUEL OF STUDY XI.

ELEMENTARY HARMONIES OF PLANTS WITH THE WATER AND THE AIR, BY MEANS OF THEIR LEAVES AND OF THEIR FRUITS.

When the Author of Nature resolved to crown with vegetables even the highest pinnacles of the earth, he first adapted the chains of the mountains to the basins of the seas, which were to supply them with vapors; to the courses of the winds, which were to waft them thither; and to the different aspects of the sun, from which they were to receive warmth. As soon as these harmonies were established between the elements, the clouds ascended from the ocean, and dispersed over the most remote parts of the continents. They there diffused themselves in a thousand different forms, in fogs, in dews, in rains, in snows, in frosts. They distilled from the upper regions of the atmosphere in manners equally various; some in a calm air, like our spring showers, fell in perpendicular drops, as if they had been poured through a sieve; others, driven by violent winds, were hurled horizontally against the sides of the hills; others descended in torrents, like those which, nine months in the year, inundate the Island of Gorgona, situated in the heart of the torrid zone, in the burning gulf of Panama. Some piled themselves in mountains of snow, on the inaccessible summits of the Andes, to cool by their waters the continent of South America, and by their frigid atmosphere the vast Pacific Ocean. Lastly, mighty rivers flowed through regions in which it never rains; and the Nile watered the plains of Egypt.

God then said: "Let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after

his kind, whose seed is in itself upon the earth." At the words of the Almighty, the vegetables appeared with organs fitted to collect the blessings of heaven. The elm arose on the mountains that skirt the Tanais, covered with leaves in the form of a tongue; the tufted box issued from the brow of the Alps; and the thorny caper-tree, from the rocks of Africa, with leaves scooped out into spoons. The pines of the sandy mountains of Norway attracted the vapors floating in the air with their taper foliage, arranged like a hair-pencil: the verbascum extended its broad leaves over the parched sands; and the fern presented, on the hills, its fan-shaped foliage to the rainy and horizontal winds. A multitude of other plants, from the bosom of the rock, from beds of flint, nay, even from marble incrustations, received the waters of heaven in cornets, in cups, in cruets. From the cedar of Lebanon to the violet that skirts the grove, there was not one but what presented its ample bowl, or its diminutive cup, conformably to its necessities or its situation.

This adaptation of the leaves of the plants of elevated situations to receive the rain, is varied without end; but their character is, in general, perceptible not only in their concave forms, but likewise in a small hollow channel on the stalk by which they adhere to the branches. It is somewhat similar to that which Nature has traced on the upper lip of man, to receive the humours which descend from the brain. It may be observed, in particular, on the leaves of thistles, which delight in dry and sandy situations. They have, besides, collateral awnings to prevent the loss of any portion of the water that falls from heaven. Plants which grow in very hot and very dry situations, sometimes have the entire stem and leaf transformed into a channel. Such is the aloe of the island of Socotora, at the entrance of the Red Sea, or the prickly taper of the torrid zone. The aqueduct of the former is horizontal, and that of the latter perpendicular.

What has prevented botanists from remarking the re-

lations that exist between the leaves of plants and the waters by which they are refreshed, is, that they see them every where nearly of the same form, in the vallies as on the eminences; but though the mountain plants exhibit foliage of every species of configuration, it may be easily perceived, from their aggregation in the form of hair-pencils or of fans, from the contraction of the leaves, or other equivalent marks, but principally from the aqueduct which I have just mentioned, that they are intended to receive the rain water. This aqueduct is traced on the stalk of the smallest leaves of mountain plants; it is by means of it that Nature has rendered even the forms of aquatic plants susceptible of vegetation in the most parched situations. The reed, for example, which is only a round, full pipe that grows by the water-side, appears incapable of collecting any humidity in the air, though it is well adapted to elevated situations by its capillaceous form, which, like that of gramineous plants, presents nothing which the wind can lay hold of. In fact, if you examine the different species of the rush that clothe the mountains in various parts of the world, such as that called icho, on the lofty mountains of Peru, which is the only vegetable that grows on some parts of them, and those that thrive, in our climates, in parched sands or on eminences, you would, at first sight, believe them to be similar to the rush of the marshes; but a little attention will enable you to observe, not without astonishment, that they are hollowed into a gutter throughout their whole length. Like other rushes, they are convex on one side: but they differ from them essentially in being concave on the other. By this character I discovered the spart, which is a rush of the mountains of Spain, and is now employed at Paris to make cordage for draw-wells.

The leaves of many plants, even in the plains, assume, on their first appearance, this form of a gutter or spoon, as those of the voilet and of most gramineous plants. In the spring you may perceive the young tufts of the latter raising

themselves up towards heaven like claws, to catch the drops, especially when it begins to rain; but most of the plants of the plains lose the gutter as they expand. It was given them only for the season necessary to their growth. It is permanent only in the plants of the mountains. It is scooped out, as I have observed, on the stalks of leaves, and in trees conducts the rain water from the leaf to the branch; the branch, by the obliquity of its position, conveys it to the trunk, whence it descends to the root by a series of consequent dispositions. If you pour water gently over those leaves of a mountain-shrub which are the most remote from its stem, you will observe it run off by the track which I have indicated, and not a single drop will fall to the ground. I had the curiosity to measure in some mountain plants the inclination formed by their branches with their stems, and I found in a dozen different species, as in the fern, the thuia, and others, an angle of about thirty degrees. It is exceedingly remarkable that this degree of incidence is the same as that formed, in a horizontal plane, by the course of many small rivers and rivulets, with the streams into which they discharge themselves, as may be ascertained upon the maps. This degree of incidence seems to be the most favorable to the efflux of various fluids which direct themselves towards a single line. The same wisdom has regulated the level of branches in trees, and the course of rivulets in plains.

This inclination is subject to some varieties in several mountain-trees. The cedar of Lebanon, for example, shoots the lower part of its branches towards heaven, and bends the extremity downward toward the earth. They have the attitude of command which is suitable to the king of vegetables, that of an uplifted arm, the hand of which is inclined. By means of the first disposition, the rain water is conveyed towards the trunk; and by the second, the snows, in the regions of which it delights, glide from its foliage. Its cones have likewise two different positions; for it first bends them towards the ground, to shelter

them at the season of flowering; but when they are fecundated it raises them up towards heaven. The truth of these observations may be confirmed by a young and beautiful cedar, in the Garden of Plants, at Paris, which, though an exotic, has preserved in our climate the attitude of a king, and the costume of Lebanon.

The bark of most mountain-trees is, in like manner, adapted to convey the rain-water from the branches to the roots. That of the pine is in large perpendicular ridges; that of the elm is split and cleft longitudinally; that of the cypress is spungy like tow.

The plants of mountains and of dry situations have farther a character which is peculiar to them in general: it is that of attracting the water which floats in the air in imperceptible vapors. The parietaria, or pellitory, which has derived its name *a pariete*, because it grows on the sides of walls, has its leaves almost always humid. This attraction is common to most of the mountain trees. All travellers agree in asserting that in the mountains of Ferro, one of the Canary Islands, there is a tree, which, every day, furnishes that island with a prodigious quantity of water. The natives call it *garoe*, and the Spaniards *santo*, on account of its utility. They tell us that it is always surrounded with a cloud, which distils abundantly down its leaves, and replenishes with water capacious reservoirs which are constructed at the foot of the tree, and afford a copious supply to the island. This effect is probably somewhat exaggerated, though reported by persons of different nations; but I give credit to the general fact. The real state of the case I take to be this, that the mountain attracts from afar the vapors of the atmosphere, and the tree, being situated in the focus of that attraction, collects them around it.

Having frequently spoken, in the course of this work, of the attraction of the summits of different mountains, the reader will not be displeased, if I here present him with an idea of this portion of the hydraulic architecture

of Nature. Among a great number of curious examples which I could adduce, and which I have collected among my materials on the subject of geography, I shall quote one, extracted not from a systematic philosopher, but from a simple and sprightly traveller of the last century, who relates things as he saw them, and without deducing from them any consequences whatever. It is a description of the peaks of the Isle of Bourbon, situated in the Indian Ocean, in the 21st degree of south latitude. It was drawn up from the papers of M. de Villers, who was then governor of the island under the East India Company. It is printed in the narrative of the voyage, performed for the first time by French Ships to Arabia Felix, about the year 1709, and was published by M. de la Roque.

"Among those plains, which are on the mountains of Bourbon," says M. de Villers, "the most remarkable, though no account has yet been given of it, is that which has been denominated the plain of the Caffres, because a number of that people, slaves to the inhabitants of the island, concealed themselves there, after they had run away from their masters. From the sea-shore you continue to rise by a gentle ascent for seven leagues, in order to reach this plain by the single road which leads to it along the river of St. Stephen. It is possible to ride it on horseback. The road is good and smooth till within a league and a half of the plain, planted with lofty and beautiful trees, the leaves of which, as they fall, afford sustenance to the tortoises, which are found there in great numbers. The elevation of this plain may be estimated at two leagues above the horizon: accordingly it appears from below to be totally lost in the clouds. It is four or five leagues in circumference; the cold is insupportable, and a continual fog, which wets as much as rain, prevents you from seeing the distance of ten paces: at night-fall you may see more distinctly than by day; but then the frost is extremely intense, and in the morning, before sun-rise, you perceive the plain frozen all over.

"But what appears to the spectator as very extraordinary, there are certain elevations of earth, cut out almost like circular columns of prodigious height; for they cannot be much lower than the turrets of Notre Dame, at Paris. They are set up like pins in a skittle ground, and resemble them so much, that you are easily led to count them. They are called *pitons* (pins). If you wish to stop and rest near any of these eminences, those who do not chuse to repose, and are inclined to walk about, must take care not to proceed to the distance of only two hundred paces, otherwise they will run a great risk of not being able to find the place from which they set out; these pins being so numerous, so much alike, and disposed so nearly in the same manner, that the Creoles, people born in the country, are themselves liable to be deceived. With a view, therefore, to prevent a circumstance so unpleasant, when a company of travellers stop at the foot of one of these pins, and any of the party are disposed to make a farther excursion, they leave some person behind to make a fire and smoke, which serves to direct and bring back the stragglers; and if, as it often happens, the fog is so thick as to hinder the fire and the smoke from being seen, they provide themselves with certain large shells, leaving one with him who remains at the foot of the eminence from which they set out. Those who proceed forward take another, and when they wish to return, they blow with violence in the shell, as in a trumpet, which emits a very shrill sound, that is heard to a great distance; so that by answering each other, they are kept from straying, and easily return to the point of departure. Without this precaution, they would be inevitably bewildered.

"In this plain there are a great number of aspen-trees, which are always green; the other trees have a moss more than a fathom in length, which covers their trunks and their large branches. They are dead, without foliage, and so impregnated with water, that it is almost impos-

sible to make a fire with them. If with great difficulty you at length kindle some of the boughs, the fire is black, without flame, yielding a reddish smoke, which spoils meat instead of dressing it. You can scarcely find in the whole plain a single spot where you can make a fire, unless you chuse some elevation near the peaks; for the soil of the plain is so humid, that the water every where gushes out, and you are continually in mud, and wet up to the calf of the leg. Great numbers of blue birds are to be seen there, nestling in the herbage, and in the aquatic ferns. This plain was unknown before the flight of the Caffres. In order to get down from it, you must take the road by which you ascended, unless you would venture upon another, which is too rugged and too dangerous.

"From the plain of the Caffres may be seen the mountain of the Three Salases, so called from the three peaks of that rock, which is the highest in the Isle of Bourbon. All its rivers issue from it, and it is so steep on every side, that there is no possibility of ascending it.

"There is in this island another plain, called the Plain of Silaos, which is still higher than that of the Caffres, and equally sterile; and it is not without great difficulty that you can climb up to it."

In this simple description of our traveller, we must excuse some errors in physics, such as his assigning to the plain of the Caffres an elevation of two leagues above the horizon. The barometer and thermometer had not taught him that there is no such elevation on the surface of the globe, and that at a league only of perpendicular altitude the ice never melts. But from the thick fog which surrounds these peaks, from their continual haze, which wets as much as rain, and which falls during the night, it is evident that they attract the vapors which the sun raises by day from the sea, and which disappear by night. Hence is formed the sheet of water which inundates the plain of the Caffres, and from which issue most of the rivers and streams that water the island. A vegetable

attraction is likewise perceptible in those ever-green aspens and trees constantly humid, with which it is impossible to kindle a fire. The island of Bourbon is nearly circular, and rises out of the sea like the half of an orange. On the most elevated part of this hemisphere are situated the plain of Silaos and that of the Caffres, where Nature has placed that labyrinth of peaks, incessantly shrouded in fogs, planted like nine pins, and lofty as towers.

If time and space permitted, I could demonstrate that there are a multitude of similar peaks on the chains of lofty mountains, of the Cordilleras, of Taurus, and others, and in the centre of most islands, without the possibility of supposing, conformably to the received opinion, that they are the remains of a primitive earth, which was raised to that height; for, as we have before asked, what could have become of the wreck of that earth, the pretended evidences of which rise on every side upon the surface of the globe? I could make it evident that they are placed there in aggregations and in situations adapted to the necessities of the earth, of which they are in some measure the reservoirs, some in the form of a labyrinth, like those of the Island of Bourbon, when they are on the summit of a hemisphere, whence they are destined to distribute the waters of heaven in every direction; others in the form of a comb, when they are placed on the lengthened crest of a chain of mountains, like the peaks of Taurus and of the Cordilleras; others grouped two or three together, according to the configuration of the districts they water. They are of various forms, and of different constructions; some are covered with earth, as those of the plain of the Caffres; and some of the Antilles islands, and which are at the same time so steep as to be inaccessible. These incrustations of earth prove that they have both fossil and hydraulic attractions.

There are others which are long needles of solid and naked rock: others are conical, or in the form of a table, like the Table Mountain at the Cape of Good Hope,

which you may frequently see the clouds accumulate, and spread out in the form of a table-cloth. Others are not apparent, but are entirely enveloped in the sides of mountains, or in the bosoms of plains. All are distinguishable by the fogs which they attract about them, and by the streams which flow in their vicinity. We may even rest assured that there exists not a single stream in the neighbourhood of which there is not some quarry of hydro-attractive, and most commonly metallic stone. I ascribe the attraction of these peaks to the vitreous and metallic substances of which they are composed. I am persuaded that it would be possible to imitate this architecture of Nature, and, by means of the attraction of these stones, to form fountains in the most parched situations. In general vitreous bodies and stones susceptible of polish are highly proper for this purpose; for, when water is diffused in great quantity through the air, as at the time of a thaw it is first attracted and adheres to the glasses and polished stones in our houses.

I have frequently observed on the summits of the mountains of the Isle of France, effects similar to those of the peaks of the plain of the Caffres in the Island of Bourbon. The clouds are incessantly collected around their peaks, which are steep, and pointed like pyramids. Some of these peaks are surmounted with a rock of a cubical form, which crowns them like a capital. Such is that which is there called Piterbooth, after a Dutch admiral of that name: it is one of the highest in the island.

These peaks are formed of a solid rock, vitrifiable and mixed with copper; they are real electrical needles, both from their form and their substance. The clouds deviate perceptibly from their course to collect round them, and sometimes accumulate in such great quantity, as to shroud them from the view. Thence they descend to the bottom of the vallies, along the skirts of the forests, which likewise attract them, and there they dissolve into rain, frequently forming rainbows on the verdure of the trees.

This vegetable attraction of the forests of this island so perfectly accords with the metallic attraction of the peaks of the mountains, that a field situated in an open place, in their vicinity, often suffers from the drought, while it is raining the whole year round in the woods at the distance of less than a musket-shot. By destroying part of the trees that crowned the eminences of that island, most of the streams which watered it were dried up: of these nothing now remains but the empty channels. To the same injudicious management, I ascribe the perceptible diminution of the rivers and streams in a great portion of Europe, as may be seen by their ancient beds, which are much too wide and deep for the volume of water they now contain. Nay, I am persuaded that to this cause must be ascribed the drought in the elevated provinces of Asia, among others, in those of Persia, the mountains of which were, without doubt, imprudently stripped of trees by the first inhabitants. I am of opinion that if mountain trees were planted in France on the eminences and at the sources of our rivers, their ancient volume of water might be restored, and many streams which have ceased to flow, would again appear in our fields. It is not among the reeds, nor in the depths of vallies that the Naiads conceal their everlasting urns, according to the representations of painters; but on the summits of rocks, crowned with groves, and near to the heavens.

There is not a single vegetable, the leaf of which is disposed to receive the rain-water in the mountains, whose seed is not formed in the manner most proper to raise itself thither. The seeds of all the mountain plants are volatile. On inspecting their leaves, you may deduce with accuracy the character of their seed, and by inspecting their seed, you may ascertain that of their leaves, and infer the elementary character of the plant. By mountain plants I here mean all those that grow in dry and sandy situations, on the ground, on rocks, on the steep banks of roads, on walls, in a word, at a distance from any water.

The seeds of the thistle, the corn-flower, the dandelion, the succory, and others, have pinions, plumes, tufts, and various means of rising, which convey them to prodigious distances. Those of grasses, which likewise travel very far, have a chaffy coat, and light appendages. Others, like that of the yellow stock-gilly flower, are formed like thin scales, and, wafted by the slightest breath of wind; they plant themselves in the smallest crevice of a wall. The seeds of the largest mountain-trees are not less volatile. That of the maple has two membraneous wings, resembling those of a fly. That of the elm is enchased in the midst of a thin oval leaf, Those of the cedar are terminated by fine, broad plates, which form a cone by their aggregation. The seeds are in the centre of the cone, and when ripe, the membranes to which they are attached separate from each other like cards, and each flies away with its kernel. The seeds of mountain plants, which appear too heavy to fly, possess other resources. The peas of the balsamine have pods whose elastic springs throw them to a great distance. There is in India a tree, the name of which I do not recollect, that, in like manner, projects its seed with a noise resembling the report of a musket. Such as have neither tufts, pinions, nor springs, and seem to be condemned by their weight to remain at the foot of the vegetable which produced them, are, in many cases, those that travel farthest. They fly with the wings of birds. It is thus that a multitude of berries and stone fruits propagate themselves. Their seeds are inclosed in stony incrustations, which are incapable of being digested. These are swallowed by the birds, who plant them on the cornices of towers, in the clefts of the rocks, on the trunks of trees, beyond rivers, nay, even beyond seas. It is by these means that a bird of the Moluccas replants the desert islands of that archipelago with nutmeg-trees, in spite of all the pains taken by the Dutch to destroy those trees in places where they cannot be subservient to their commerce. This is not the proper time

for treating of the relations of vegetables to animals. It is sufficient to observe, by the way, that most birds resow the vegetable which feeds them. We even find among ourselves that there are quadrupeds which convey the seeds of grasses to a great distance; such are, among others, those that do not chew the cud, as the horse, whose dung is injurious to the meadows, for this reason, that it introduces into them a great number of foreign plants, as the heath and the furze, the seeds of which they are unable to digest. They resow others which adhere to their coats, by the mere motion of their tails. There are little quadrupeds, as the dormouse, the hedgehog, and the marmot, which convey to the most elevated parts of the mountains acorns, beech-mast, and chesnuts.

It is well worthy of remark, that the volatile seeds are much more numerous than the other species, and in this we ought to admire the sagacity of a Providence, which foresaw every thing. The elevated situations for which they are destined, were liable to be soon stripped of their vegetables by the declivity of their soil, and by the rains, which have a constant tendency to lower them. By means of the volatility of seed, they have become of all the parts of the earth the most prolific in plants. It is upon the mountains that the treasure of the botanist is placed.

It cannot be too often repeated, that the remedies of Nature are always superior to the obstacles she has opposed, and that her compensations exceed her gifts. Indeed, if you except the inconveniences of the declivity, a mountain affords to plants the greatest variety of exposures. In a plain they have the same sun, the same humidity, the same soil, the same wind; but if you ascend a mountain situated in our latitudes only twenty-five fathoms of perpendicular height, you experience a change of climate as great as if you had proceeded twenty-five leagues towards the north; so that a mountain twelve hundred perpendicular fathoms in height, presents a scale

of vegetation as extensive as that of twelve hundred horizontal leagues, which is nearly our distance from the pole; both the one and the other must terminate in everlasting ice. Every step we take upon a mountain, whether ascending or descending, changes our latitude, and in making a circuit round it, every step changes our longitude. We shall find points where the sun rises at eight in the morning; others at ten, others at noon. We shall there meet with an infinite variety of exposures, of cold to the north, of hot to the south, of rainy to the west, of dry to the east; exclusive of the different reflections of heat in sands, in rocks, in the surfaces of vallies and lakes, which modify them in a thousand different ways.

We shall farther observe, with astonishment, that the season of maturity of most volatile seeds, is about the beginning of autumn: and that, by an effect of that universal wisdom which causes all the parts of Nature to act in concert, it is then that we have violent winds, about the end of September or the beginning of October, called equinoctial gales. These winds blow in all parts of the continents, from the bosom of the seas to the mountains disposed in conformity to them. They not only convey thither the volatile seeds which have attained maturity, but blend with them thick clouds of dust, which they carry off from lands dried by the heats of summer, and particularly from the sea-shores, where the perpetual motion of the waves that break upon them, rolling the pebbles incessantly to and fro, reduces the hardest substances to an impalpable powder.

These emanations of dust are so abundant in different places, that I could produce many instances of vessels being covered with it, while crossing gulphs, though at the distance of more than six leagues from land. In the most elevated parts of Asia they are so troublesome, that all travellers who have been at Pekin, assure us it is impossible to walk in the streets of that city, at one season of the year, without veiling the face. There are showers of

dust which repair the summits of mountains, as there are showers of rain which replenish their sources. Both the one and the other proceed from the sea, and return to it by the currents of the rivers, which are perpetually conveying thither their tribute of water and sand. The maritime winds unite their efforts towards the autumnal equinox, transport from the circumference of the continents to the mountains, which are the most distant from it, the seeds and the manures that have been washed from them, and sow meadows, groves, and forests on the sides of precipices, and on the most elevated peaks. Thus the leaves, the stems, the seeds, the birds, the seasons, the seas, and the winds concur in a wonderful manner to keep up the vegetation of the mountains.

I have been mentioning the relations of plants to mountains; I am sorry it is not in my power to introduce here the relations which mountains themselves have to plants, according to my intention. All I can say on the subject is this: so far are mountains from being the productions either of the centrifugal power, or of fire, or of earthquakes, or of the current of the waters, that I know of at least ten different species, each of which has a configuration the most proper for maintaining in every latitude the harmony of the elements relative to vegetation. Each of them has moreover vegetables and quadrupeds peculiar to itself, and not to be found elsewhere, which is an evident demonstration that they are not the work of chance. Finally, among this immense number of mountains which cover the greatest part of the five zones, and especially the torrid and the frigid zone, there is but one single species, and that the least considerable of all, which presents to the currents of waters projecting and retreating angles in correspondence. This, however, is no more their work than the basin of the seas is itself the work of the ocean. But this interesting subject, of too great extent for this volume, belongs, besides, to the province of geography.

Let us now proceed to the harmonies of aquatic plants.

Aquatic plants have dispositions totally different in their leaves, in the attitude of their branches, and, above all, in the configuration of their seeds. Nature, as I have already observed, in order to vary her harmonies, frequently employs none but positive or negative harmonies. She has given an aqueduct to the stalk of the leaves of mountain plants; she withholds it from such as grow by the side of waters, and converts them into aquatic plants. These instead of having their leaves hollowed out into gutters, produce leaves smooth and sleek, as the corn-flag, which produces them in the form of the blade of a dagger; or swelling in the middle like a sword-blade, as those of the reed called typha, the common species, the stem of which the Jews put into the hands of Jesus Christ. Those of the nymphæa are flat, and turned into the form of a heart. Some of these species affect other forms; but their long stalks are uniformly destitute of a channel. Those of rushes are round like a pipe. There is a great variety of rushes on the banks of morasses, rivulets, and streams. They are found of all sizes, from such as are as fine as a hair, to those which grow in the river of Genoa, and are as large as sugar canes. Whatever difference there may be in the articulation of their stalks and of their blades, they have all in their plan a rounded or elliptical form. You will find that only those species which grow in dry situations are fluted and hollowed out on their surface. When Nature designs to render aquatic plants susceptible of vegetation on mountains, she bestows aqueducts on their leaves: but when, on the contrary, she intends to place mountain plants on the brink of waters, she withholds it. The aloe of the rock has its leaves hollowed out into a scoop; those of the water aloe are full. I am acquainted with a dozen species of mountain fern, all of which have a small channel along their branches, and the only marsh species which I know is destitute of it. The attitude of its branches is likewise very different from that of the others: the former erect them towards heaven, the latter bears them almost horizontally.

If the leaves of mountain plants are constructed in the manner best adapted for collecting at their roots the waters of heaven, which they have not at their disposal, those of aquatic plants are disposed in such a manner as to throw it off, because they are destined to grow in the bosom of waters, or in their vicinity. The leaves of trees that love to grow on the brink of rivers, as those of the birch, the aspen, and the poplar, are attached to long and pendent stalks. There are others which have their leaves arranged like tiles, as the Indian chesnut and walnut-tree. Those of the plants which grow in the shade round the trunks of trees, and which attract by their roots the humidity that the tree collects by its foliage, as the French-bean and convolvulus, have a similar port. But such as grow entirely in the shade of trees, and have scarcely any roots, as the mushroom, are furnished with leaves, which, instead of pointing upward to heaven, turn downward to the ground. Most of them are formed on the upper side into a thick parasol, to prevent the sun from drying the spot on which they grow; and they are divided underneath into thin plates, to receive the vapors exhaled from it, nearly in the same manner as those of the horizontal wheel of a steam-engine receive the emanations of the boiling water that make it turn round. They have various other means of refreshing themselves by these exhalations. There are numerous species which are lined with tubes, and others are stuffed with sponges. Some have a stalk hollow within, and which, being surmounted with a capital, collect in that part the emanations of the soil, as in an alembic. Thus not the smallest portion of vapor is lost throughout the whole universe.

What I have just said concerning the inverted forms of mushrooms, their leafy plates, the tubes and sponges with which they are lined for receiving the vapors that are exhaled from the earth, confirms what I have advanced relative to the use of the leaves of mountain plants scooped out into gutters, or constructed in the form of a

pencil, or of a fan, to catch the waters of heaven. But aquatic plants, having no need of these recipients, because they grow in the midst of water, are furnished, if I may be allowed the expression, with repulsive foliage. I shall here introduce an object of comparison well calculated to convince the reader of the truth of these principles: for example, the box of the mountains and the caper of the rocks have leaves hollowed into the form of a spoon; but the *vaccinia palustris*, which has likewise concave leaves, bears them inverted, with the cavity turned towards the earth. By this negative character I knew that a rare plant in the Garden of Plants, which I had never seen before, was a native of the marshes. It is the *lætum palustre*, which grows in the marshes of Labrador. Its leaves, in the form of small tea-spoons, are all inverted, their convex side being turned upward. The water-lentil of our marshes, as well as the typha of our rivers, has the middle of its leaf swelled out.

Botanists, on observing leaves nearly similar in the plains, on the brink of waters, and on the tops of mountains, never suspected that they might be applied to such different purposes. Many of them undoubtedly possess extensive knowledge; but it is rendered entirely useless to them, because their method obliges them to proceed in one single track, and their system indicates only one kind of observation. This is the reason why their most numerous collections frequently present nothing but a mere list of names. The study of Nature is replete with spirit and intelligence. Her vegetable order is an immense volume, of which the plants form the ideas, and the leaves of those same plants the letters. There is not even any great number of primitive forms in the characters of this alphabet, but with their various assemblages she composes, as we do with ours, an infinite multitude of different ideas. She frequently has occasion, like us, to change only an accent, in order to produce a total alteration in the sense of an expression. She places rushes, reeds, arums, with

smooth foliage and a full stalk on the banks of rivers; by adding an aqueduct to the leaf, she converts them into rushes, reeds, and arums of the mountains.

We must, however, be careful not to generalize these means, otherwise they would not fail to lead us into a misconception of her procedure. Some botanists, for example, having suspected that the leaves of some plants might be adapted to collect the rain-water, imagined that those of the dipsacus, or fuller's thistle, were formed for the same purpose. It was very easy to fall into this mistake, for they are opposite to each other, and joined at their bases, so that, after a shower, they present reservoirs, each containing full half a glass of water, and which are disposed in stages up its stem. But they ought to consider, in this first place, that the dipsacus grows spontaneously on the banks of rivers, and that Nature never bestows reservoirs of water on aquatic plants. This would be, as the proverb says, carrying water to the sea. In the second place, they might have observed that the stages formed by the opposite leaves of the dipsacus, so far from being reservoirs, are, on the contrary, dischargers which convey the rain-water from its roots to the distance of nine or ten inches on every side, by the extremities of its leaves. They resemble, in some respects, the gutters which project from the roofs of our houses, or those formed by the corners of our hats, which serve to carry away the rain-water, and not to convey it to us. Besides, the water which remains in the wings of the leaves of the dipsacus, can never descend to the root of the plant, since it is detained there as in the bottom of a vessel. It would not even be proper for watering it, for Pliny asserts that it is salt. The heartwort, which grows in the trembling and mossy marshes of Canada, bears at its base two leaves, formed like the halves of a trumpet sawed lengthwise. They are both concave; but at the farthest extremity from the plant, they have a kind of beak like a spout. The water which remains in the vases of these

aquatic plants, is perhaps intended to refresh the small birds, which are sometimes not a little embarrassed for drink during the inundations of waters. It is necessary to make a distinction between the elementary characters of plants and their relative characters. Nature obliges the man who studies her works not to confine himself to external appearances, and in order to form his understanding, to rise from the means she employs to the ends she proposes. If some aquatic plants appear to present in their foliage certain characters of mountain plants, there are others in the mountains which seem to exhibit characters resembling those of the waters; such is, for example, the broom. It bears leaves so small, and so few in number, that they appear insufficient to collect the water necessary for its growth, especially as it thrives in the most droughty soils. Nature has indemnified it in another manner. If its leaves are small, its roots are of extraordinary length. They shoot out to a great distance in search of refreshment. I have seen some of them extracted from the ground which were more than twenty feet long: and it was found necessary after all to break them without coming to the end. Notwithstanding this, its scanty leaves have the mountain character; for they are concave, point towards heaven, and are lengthened out like the lower mandible of birds.

The greatest part of aquatic vegetables throw the water from them, some by their port, as the birch, whose branches, instead of being erected towards heaven, fall in the form of an arch. The same observation applies to the chesnut and walnut, unless those trees have changed their natural attitude, by growing in dry situations. In general their bark is smooth, as in the birch, or scaly, as in the chesnut; but it is not furrowed into gutters, like that of the elm, or of the mountain pine. Others possess a repulsive quality; such are the leaves of the nymphæa, and various species of the cabbage, in which drops of water collect like globules of quicksilver. There are even some

which cannot be wetted without great difficulty: such are the stems of several varieties of maiden-hair. The laurel, we are told, possesses a repulsive quality so powerful as to repel lightning. If this property, so highly extolled by the ancients, be actually possessed by the laurel, it is doubtless owing to its nature as a fluviatic tree. It grows in abundance on the banks of the rivers in Thessaly. A traveller, whose name is the Sieur de la Guilletiere, says, in a narrative of his voyage to Lacedæmon, written in a very pleasing style, that he never beheld such beautiful laurels as on the banks of the river Peneus. 'Twas this probably that gave rise to the fiction of the metamorphosis of Daphne, the daughter of that river-god, whom Apollo transformed into a laurel. This repulsive property of various trees, and of certain aquatic plants, induces me to think that they might be employed around our habitations, as a security against thunder-storms, in a manner much more certain and agreeable than electrical conductors, which cannot dissipate without attracting them into their neighbourhood. They might likewise be employed to advantage in draining marshes, in the same manner as we might avail ourselves of the attractive qualities of various mountain vegetables to form springs on eminences, and to collect the vapors that float in the air. There is probably not a single infectious morass on the surface of the globe, except in those places where men have destroyed the plants whose roots absorb the waters of the earth, and whose leaves repel those of the heavens.

It is not my intention to assert that the leaves of aquatic plants have no farther uses, for who can be acquainted with the innumerable views of Nature? "To whom has the source of wisdom been revealed, and who hath known her counsels?" In general the leaves of aquatic plants appear adapted, from their extreme moveableness, to renew the air of humid situations, and to produce, by their motion, that drying of the ground which I have already mentioned. Such are the leaves of the reed, of the poplar,

of the aspen, of the birch, and even of the willow, which sometimes stir when you cannot perceive the slightest breath of wind. It is farther remarkable that most of these vegetables, among others, the poplar and the birch, have a very agreeable smell, especially in spring, and that many aromatic plants grow on the brink of waters, as the mint, the marjoram, the species of rush called cyperus, the flower de luce, the *calamus aromaticus*; and, in India, the spice trees, such as the cinnamon, the nutmeg, and the clove. Their perfumes must powerfully contribute to diminish the mephitic exhalations natural to marshy and humid places. They have likewise various uses relative to animals, as to afford shade to the fishes which repair to them for shelter from the heat of the sun.

From these different observations we may deduce the following useful conclusion for agriculture. When we cultivate plants, the stalk of whose leaves is not provided with a channel, it is necessary to give them a great quantity of water; for then they are aquatic in their nature. The nasturtium, the mint, and the marjoram, consume a prodigious quantity. But when plants have this channel, they must be watered more sparingly, because they are mountain plants. The deeper the channel is, the less watering they require. Every gardener knows that if you frequently water the aloe or the taper of Peru, you infallibly kill them.

The seeds of acquatic plants have forms not less adapted than those of their leaves to the situations in which they are destined to grow: they are all constructed in the most suitable manner for swimming. Some are formed into shells, others into boats, rafts, wherries, single and double canoes, resembling those of the South Sea. I have not the least doubt that if we were to study this part alone, we should make a multitude of very curious discoveries on the art of crossing every kind of currents: and I am persuaded that the first of mankind, who were much more accurate observers than we, borrowed their different methods of navigation from these models of Nature, of which our boasted

inventions are nothing more than imperfect imitations The aquatic or maritime pine has its kernels inclosed in a kind of small bony sandals, indented on the under side, and covered on the upper with a piece resembling a ship's scuttle. The walnut, which delights so much in the banks of rivers, has its fruit shut up between two skiffs, laid one upon the other. The hazle which becomes so bushy on the brink of rivulets, the olive, which loves the sea-shore to such a degree that it degenerates the farther it is removed from it, bear their seed inclosed in a species of casks, capable of making very long voyages. The red berry of the yew, which delights in cold and humid mountains on the borders of lakes, is scooped into the form of a little bell. When it drops from the tree, it is at first carried by its fall to the bottom of the water, but it soon rises to the surface, by means of a cavity which Nature has placed, in the form of a navel, in the upper part of its seed. In this aperture is lodged a bubble of air, which brings it back to the surface of the water by a mechanical contrivance more ingenious than that of the diving-bell, because in the latter the vacuum is below, and in the yew-berry it is uppermost. The forms of the seed of aquatic plants are still more curious, for Nature universally bestows a double portion of attention on the little and the weak. That of the rush resembles the eggs of the crab; that of fennel is a real canoe in miniature, hollowed in the middle, and having two elevated prows. There are others set in blades, resembling worm-eaten float-wood: such are those of the horned poppy. Those that are intended to grow on the brink of waters which have no currents, are furnished with sails; such is the seed of a scabiosa of this country, which delights in the borders of marshes. Differing from the seed of other scabiosæ, which are crowned with crooked hairs to fasten themselves on those of the animals which transplant them, this is surmounted by a half bladder, open and laid upon its summit like a gondola. This half-bladder serves the twofold purpose of a sail

and a vehicle. These means of natation, though infinitely varied, are common in every climate to the seed of aquatic plants. The almond of the Amazons, called *totoca*, is inclosed in two shells exactly similar to those of an oyster. Another fruit, on the shores of the same river, which is full of kernels, bears an accurate resemblance, both in color and in form, to an earthern pot with its lid. It is denominated the monkey's porridge pot. There are others formed into large bottles, as the fruit of the calebash. Other seeds are coated with a kind of wax, which causes them to float; such are the berries of the wax-tree, or royal pimento of the shores of Louisiana. The so much dreaded apple of the manchineal, which thrives on the strands of the islands situated between the tropics, and the fruits of the mangrove, which actually grows in the salt-water, are almost ligneous. There are others whose shells resemble the sea-urchin, stripped of its prickles. Many are coupled, and perform their voyage like the double canoes of the South Sea. Such is the double cocoa of the Sechelles Islands.

If you examine the leaves, the stems, the attitudes, and the seeds of aquatic plants, you will invariably perceive in them characters relative to the places in which they are destined to grow, and coinciding with each other: so that if the seed has a nautical form, its leaves are without an aqueduct: just as in mountain plants, if the seed is volatile, the stalk of the leaf, or the whole leaf, exhibits a chanuel. As an instance of the nautical harmonies of plants, I shall take the nasturtium, with which every person is acquainted. This plant, which produces flowers so agreeable, is a species of cress of the streams of Peru. In the first place it must be remarked that the stalks of its leaves are without aqueduct, like those of all aquatic plants; they are attached to the middle of the leaves which they bear in the form of umbrellas, to ward from them the waters of heaven. Its green seed has exactly the form of a boat. The upper part is raised into a slope like a bridge, that

the water may run off; and underneath you clearly distinguish a stem and a stern, a bottom and a keel. The furrows of the seed of the nasturtium are characters common to the most part of nautical seeds, as well as the triangular forms, and those of the kidney or the boat. These furrows undoubtedly prevent it from rolling in every direction, oblige it to float along lengthwise, and give it the most proper direction for following the current, and passing through narrow straits. But they possess a character still more general, which is, that they swim when in a state of maturity, which is not the case with seed intended to grow in the plains, as pease and lentils, which sink to the bottom. Some species, however, as French beans, first sink to the bottom of the water, and afterwards, when they are penetrated with it, rise to the surface. There are others, on the contrary, which at first float, and afterwards sink: such is the Egyptian bean, or the seed of the colocasia, which grows in the waters of the Nile. It is necessary, in order to sow it, that it should be inclosed in a little ball of earth, after which it is thrown into the water. Without this precaution, not one would remain on the shores where it is designed to grow. The natability of aquatic seed is without doubt proportioned to the length of the voyages they are destined to perform, and to the different gravity of the waters on which they are intended to swim. There are some that float on sea-water, and sink in fresh, which is lighter than the former by one thirty-second part: such is the precision of the scales of Nature. I believe that the fruit of the Indian chesnut, which grows on the brink of the salt creeks of Asia, is in this predicament. Finally, I am so thoroughly convinced of all the relations which Nature has established among her works, as not to entertain a doubt that the time when the seeds of aquatic plants drop is regulated, in general, by the season of the overflowing of the rivers on whose banks they grow.

It is a speculation well worthy of the attention of the

philosopher, to trace these vegetable fleets, sailing night and day with the currents of rivers, and landing without pilots on unknown shores. There are some, which, by the inundations of rivers, are sometimes carried astray into the plains. I have sometimes observed them accumulated upon each other in the beds of torrents, presenting around their pebbles, where they had germinated, waves of verdure of the most beautiful sea-green. You would have said that Flora, pursued by some river god, had dropped her basket into the urn of the deity. Others, more fortunate, departing from the sources of some stream, are carried along by the current of great rivers, and embellish their banks with a verdure not their own. There are some tha. cross the vast ocean, and, after a long voyage, are driven by the very tempests on the shores which they enrich. Such are the double cocoa-nuts of the Sechelles or Mahé Islands, which are regularly wafted by the sea every year to the coast of Malabar, a distance of four hundred leagues. The Indians by whom it is inhabited, long conceived that these presents of the ocean were the fruit of a palm-tree which grew beneath its waves. They gave them the name of marine cocoa nuts. They ascribed to them wonderful qualities; they prized them as much as ambergris, and set such a high value upon them, that many of these fruit shave been sold for one thousand crowns a-piece. But the French, having some years since discovered the Island of Mahé, which produces them, and which is situated in the 50th degree of south latitude, imported them in such quantities into India, as to sink at once their value and reputation, for in every country men prize only what is rare and mysterious.

In all the islands where the eye of the traveller has been able to survey the primitive arrangements of Nature, he has found the shores covered with vegetables, all the fruits of which possess nautical characters. Jacques Cartier and Champlain represent the strands of the lakes of North America as shaded by stately walnut-trees. Homer, who

had studied Nature so profoundly, in an age and in countries where she still retained her virgin beauty, has placed wild olives on the shores of an island on which Ulysses, floating on a raft, is thrown by the tempest. Those navigators who made the first discoveries in the seas of the East Indies, frequently found in them rocks planted with cocoa-trees. The sea casts on the shore of Madeira such a quantity of fennel-seed, that one of its bays has from this circumstance been denominated the bay of Funchal, or Fennel. It was by the course of these nautical seeds, to which too little attention is paid by modern seamen, that the savages first discovered the islands which were to windward of the countries they inhabited. They formed conjectures concerning a tree at a great distance, on beholding its fruit cast upon their shores. It was by similar indications that Christopher Columbus was convinced of the existence of another world; but the west winds and currents in the South Sea had long before wafted them to the nations of Asia; of which I shall say something at the conclusion of this Study.

There are, besides, amphibious vegetables. These Nature has disposed in such a manner, that one part of their foliage rises toward heaven, and the other forms an arch, being down toward the ground. She has likewise given to their seeds the power both of swimming and of flying. Such is the willow, whose seed is enveloped in a cobweb-down, which the winds wafts to a great distance, and which floats on the surface of the water without wetting itself, like the feathers of the duck. This downy substance is composed of small capsules, like the bottom of a lamp, and having two beaks, filled with seeds, which are crowned with plumes: so that the wind carries these capsules into the air, and likewise blows them along on the surface of the water. This configuration is admirably adapted to the vehicles of the seeds of plants which grow on the banks of stagnant waters and of lakes. It is the same in the seeds of the poplar; but those of the alder,

which grows on the banks of rivers, have no plumes, because those streams convey them along with their currents. Those of the pine and of the birch possess characters both volatile and nautical; for the kernel of the former is attached to a membraneous wing, and the seed of the latter is furnished with two wings, which give it the appearance of a little shell. These trees grow both on the wintry mountains and on the margin of the lakes of the north: their seed, therefore, had occasion not only to sail over the stagnant waters, but to be transported through the air over the snows, in which they delight. I have no doubt that there may be species of these trees whose seeds are altogether nautical. Those of the linden are inclosed in a spherical body, resembling a small bullet. This bullet is affixed to a long stalk, from the end of which descends obliquely a follicle of considerable length, whereby the wind carries it to a great distance, whirling it round and round. When it falls into the water, it plunges about the depth of an inch, and serves in some measure as ballast to its stalk and the follicle attached to it, which, being in a vertical situation, then perform the functions of a mast and a sail. But the examination of so many curious varieties would lead us too far.

This would be the proper place to treat of the roots of vegetables; but I know very little of what passes under ground. Besides, in every latitude, on eminences as well as on the margin of waters, we find nearly the same substances, mud, sand, mould, rocks, which must produce a much greater similarity in the roots of plants than in any other part of their vegetation. I have no doubt, however, that Nature has established, in this particular, relations, the knowledge of which would be highly useful, and that an experienced cultivator may tell, on inspecting the root of a vegetable, what species of soil is adapted to it. Those which are very bushy, seem most proper for sandy situations. The cocoa, which is a large tree of the shores of the torrid zone, grows in pure sand, which it interlace-

with such a prodigious quantity of fibres, as to form around it a solid mass. It is on this basis that it withstands the most furious tempests in the midst of a moving soil. What is very remarkable on this head, is, that it thrives only in the sand on the sea-shore, and commonly languishes in the interior of the country. The Maldivia islands, which are in general nothing but sandy rocks, are the most celebrated spot in Asia for the fecundity and the beauty of their cocoa-trees. There are other vegetables of the shores whose roots resemble cords. This configuration renders them extremely proper for binding the earth about them, and for defending them against the inroads of the waters. Such are with us the alder, the reed, but above all a species of dog's grass, which I have seen cultivated with great care in Holland, along the dykes. Bulbous plants appear, in like manner, to delight in soft mud, into which they cannot sink far from the rotundity of their roots. But the elm extends its roots over the declivities of mountains, which it loves; and the oak there inserts his sturdy pivots to keep up the strata of which they are composed. Other plants preserve on the eminences by their creeping foliage and their superficial roots the emanations of dust which the winds there deposit. Such is the *anemone nemorosa*. If you find a single plant of it on a hill, in a wood not too much frequented, you may rest assured that it spreads like a net over the whole extent of that wood.

There are trees whose trunks and roots form admirable contrasts with obstacles, which, to us, appear accidental, but which are foreseen by Nature. For example, the cypress of Louisiana grows in water, principally on the banks of the Meschasebe, whose vast shores it magnificently borders. It there rises to a height exceeding that of almost all the trees of Europe. To the trunk of this tree Nature has given a circumference of thirty feet, to enable it to resist the ices of the northern lakes, which discharge themselves into that river, and to the prodigious

floats of timber that are carried down its stream, and have obstructed most of its mouths to such a degree as to render them unnavigable to vessels of any considerable burden To remove the possibility of doubt that she has designed the thickness of the trunk for withstanding the shock of floating bodies, at the height of six feet she suddenly diminishes the size by one third, the full magnitude having become superfluous at that elevation. In order to secure it still more effectually, she raises out of the root of the tree, at the distance of four or five feet all round, several large stumps from one to four feet high. They are not shoots, for their tops are smooth, and bear neither leaves nor branches; they are real ice-breakers. The tupelo, another great tree of Carolina, which likewise grows by the water's side, but in creeks, has nearly the same dimensions at its base, excepting the ice-breakers or palisades. The seeds of these trees are fluted, as I have already observed to be the case with aquatic seeds in general; and the seed of the cypress of Louisiana differs considerably in its nautical form from that of the cypress of the mountains of Europe which is volatile. These observations are so much the more worthy of credit, as Father Charlevoix, who states them in part, deduces from them no consequence whatever, though he was exceedingly capable of explaining their utility.

The reader must be sensible of the importance of combining the study of plants, with that of the other works of Nature. By their flowers it is possible to ascertain the exposure of the sun which is most suitable to them; by their leaves the quantity of water they require; by their roots the soil which is proper for them; and by their fruits the situations in which they are destined to grow, together with new relations to the animals which feed upon them. By fruit I mean, in the language of botanists, every species of seed.

The fruit is the principal character of the plant. This we may discover, at first sight, from the care bestowed by

Nature on its formation and preservation. It is the ultimate term of her productions. If you examine in a vegetable the different envelopes which inclose its leaves, its flowers, and its fruits, you will find a wonderful progression of attentions and of precautions. The mere leaf-buds are easily recognized by the simplicity of their cases. Nay, there are some plants which have none at all, as the shoots of the gramineous, which spring immediately out of the earth, without needing any foreign protection. But the buds which contain flowers have kernels stuffed with down, as those of the apple-tree; or coated externally with glue, as the Indian chesnut; or they are inclosed in bags, as the flowers of the narcissus, or secured in such a manner as to be perfectly distinguishable even before their expansion. You may perceive in the next place that the apparatus of the flower is entirely destined for the fecundation of the fruit; and when this is once formed, Nature redoubles her precautions both internally and externally for its preservation. She gives it a placenta; she envelops it in pellicles, in shells, in pulps, in pods, in capsules, in rinds, in husks, and sometimes in prickles. A mother cannot pay greater attention to the cradle of her infant. Then, to enable it to seek a settlement in the world, she crowns it with tufts, or incloses it in a shell; furnishes it with wings to fly away, or a bark to sail over the waters.

There is a circumstance still more remarkable with respect to fruit. It is this—that Nature frequently varies the leaves, the flowers, the stems, and the roots of a plant, but the fruit always remains the same, if not as to its form, at least as to its essential substance. I am persuaded that when she was pleased to create a fruit, she designed it to possess the power of reproducing itself on the mountains, in the plains, in the midst of rocks, in sands, on the margin of waters, and under different latitudes: and to adapt it to these situations, she has varied the watering-pots, the mirrors, the supporters, the attitude, and the clothing of the vegetable, according to the sun, the rain, the winds, and

the soil. To this intention must, in my opinion, be ascribed the prodigious variety of species in each genus, and the degree of beauty which each of them attains when in its natural situation. Thus when she formed the chesnut to thrive in the rocky mountains of Southern Europe, and to supply the want of corn which will scarcely grow there, she placed it on a tree which becomes magnificent from its harmonies. I have eaten chesnuts of the Island of Corsica; they are of the size of small hens'-eggs, and are an excellent fruit. A modern traveller gives a description of a chesnut-tree which grew in Sicily on the declivity of Mount Etna. Its foliage is so extended that one hundred horsemen could repose conveniently beneath its shade. For this reason it was denominated *centum cavallo*. Father Kircher asserts that on the same mountain, at a place called Trecastagne, he saw three chesnut-trees of such prodigious magnitude, that when they were felled, a whole flock of sheep might have been lodged beneath their bark. The shepherds made use of them at night and in bad weather as a fold. Nature has bestowed on this stately vegetable the faculty of collecting on the steep mountains the waters of the atmosphere with its tongue-shaped leaves, and of penetrating with its sturdy roots to the very bed of fountains, in spite of the thick strata of lavas and of rocks. She has likewise been pleased to give this fruit a degree of bitterness, for the use of some animal or other, on the shores of the salt-water creeks and arms of the sea in Asia. She has clothed the tree that bears it with leaves disposed in the form of tiles, scaly bark, and flowers different from those of the European chesnut, but undoubtedly adapted to those aspects of the sun to which it is exposed. She has transformed it into the Indian chesnut. It thrives in much greater beauty in its native country than in Europe. The Asiatic is the maritime chesnut, and the European is the chesnut-tree of the mountains. Perhaps by another combination she has placed this fruit on the beech of our hills, the masts of which is evidently a species of chesnut. Lastly, in consequence of one of those

maternal attentions which induce her to suspend on the very grasses the productions of trees, and to serve up the same dishes on the smallest tables, she has perhaps reproduced the same fruit in the grain of buckwheat, which, in its color and triangular form, resembles the seed of the beech called in Latin *fagus*, whence this species of corn has obtained the name of *fagopyrum*. So much at least is certain, that independent of the floury substance, we find in buck-wheat, in beech-mast, and in the chesnut, similar properties, such as that of abating excessive heat of urine.

Nature likewise thought fit to produce the acorn in a variety of exposures. Pliny, at his time, enumerated thirteen different species in Europe; one of these, which is good to eat, is that of the holm-oak. It is of this that the poets speak when they extol the golden age, because its fruit then served as aliment for man. It is highly remarkable, that there is not a single species of vegetable but what furnishes, in some species, a substance adapted to the purposes of food. The acorn of the holm-oak is the portion which has been reserved for us among the fruits of this genus. Nature has been pleased to distribute it over the different soils of America, to supply the necessities of her other creatures. She has retained the fruit, and has varied the other parts of the vegetable. She has placed the acorn, with the leaves of the willow, on the willow-oak, which grows there on the brink of waters. She has suspended it together with small leaves attached to pliant stalks, like those of the aspen, on the water-oak, which there thrives in the marshes. But when she determined to plant them in dry and parched soils, she bestowed on them leaves ten inches in breadth, adapted to the collection of rain water; such are those of the species known in that country by the name of the black oak. It should farther be observed, that the place where any species of plant produces the finest fruit, determines its principal genus. Thus, though the oak has species which are diffused over the whole earth, it must, however, be considered as be-

longing to the class of mountain-trees; for that which grows on the mountains of America, and is there denominated the chesnut-leafed oak, yields the largest acorns, and is one of the greatest trees of that part of the world, while the willow-oak and the water-oak rise to an inconsiderable height, and produce very small acorns.

The fruit, as we have seen, is the invariable characteristic of the plant: to it, therefore, Nature attaches the principal relations of the animal kingdom to the vegetable. It was her pleasure that an animal of the mountains should find the fruit on which he has been accustomed to live, in the plains, on the sands, among the rocks, when he is necessitated to change his country, and especially on the banks of rivers, when he repairs thither to quench his thirst. I am not acquainted with a single mountain plant but what has some of its species scattered, with suitable varieties, over all situations, but principally on the margin of waters. The mountain pine has its kernels furnished with wings, and the aquatic pine has its seed inclosed in a skiff. The seeds of the thistle, which grows in dry situations, have plumes to convey them from place to place: those of the fuller's thistle, which thrives on the brink of waters, have none, because they have no occasion for their assistance in swimming. Their flowers are varied for similar reasons; and though botanists have classed them in genera totally different, yet the goldfinch fails not to acknowledge the latter as a real thistle. He reposes upon it, when he repairs to cool himself to the brink of some stream. He forgets, on beholding his favourite plant, the sandy downs where he burst into life, and he enlivens the banks of our rivulets with his song and his plumage.

To me it appears impossible to obtain an acquaintance with plants, without studying their geography and their calendars; without the knowledge of these two subjects each of which reflects light on the other, their forms will ever remain strange to us. Most botanists, however, pay

no regard to them. In collecting them, they remark neither the season nor the place, nor the aspect in which they grow. They pay attention to all their intrinsic parts, and especially to their flowers; and, after this mechanical examination, they deposit them in their herbary, and imagine they have a perfect knowledge of them, particularly if they have distinguished them by some Greek name. They resemble a certain hussar, who, having found a Latin inscription, in bronze letters, on an ancient monument, disengaged them one after the other, and put them all together into a basket, which he sent to one of his friends, who was an antiquary, requesting to be informed what they meant. They no more lead us to a knowledge of Nature, than a grammarian would make us acquainted with the genius of Sophocles, by giving us a mere catalogue of his tragedies, of the division of their acts and scenes, and of the number of verses of which they are composed. Equally absurd is the conduct of those who make collections of plants, without noticing their relations to each other and to the elements; they preserve the letter, but suppress the sense. It was not thus that a Tournefort, a Vaillant, a Linnæus, pursued their botanical researches. If these learned men have not deduced any consequence from these relations, they have at least prepared the corner stones for rearing the future fabric of science.

Though the observations I have presented relative to the elementary harmonies of plants are few in number, I may venture to affirm that they are of the highest importance to the improvement of agriculture. The question is not to determine with geometrical precision the genera of flowers whose mirrors are the best adapted to reflect the sun's rays in every point of latitude; the glory of calculating their curves is reserved for future Newtons. Nature has exceeded our most sanguine wishes in places where she has been suffered to follow her own plans. The most advantageous method of ensuring prosperity to ours, is to make them correspond with hers. To ascertain what plants are

best adapted to a certain soil, nothing more is necessary than to observe what wild plants thrive there spontaneously, and are distinguished by their vigor and their multitude; then substitute in their stead domestic plants, with the same kind of flowers and leaves. Wherever umbelliferous plants grow, plant in their place such of our culinary vegetables as have most analogy to them in their leaves, flowers, roots, and seeds, such as the daucus: the artichoke will there usefully replace the gaudy thistle; the domestic plumb, ingrafted on the wild tree, in the same place where the last spontaneously sprung up, will become extremely vigorous. I am persuaded that by these natural approximations, we might turn the most barren sands and rocks to good account; for there is not a single genus of wild plants which does not contain a species that is fit for food.

But it would not have been sufficient for Nature to have established so many harmonies between plants and the situations in which they were destined to grow, had she not likewise provided the means of renewing them when destroyed by the injudicious management of man. Let a spot of ground be left for ever so short a time uncultivated, and you will soon see it covered with vegetables. They grow in such numbers and so vigorously, that no laborer can produce an equal quantity on the same extent of ground, with the most careful cultivation. Yet these plants, so vigorous and so rapid in their growth, which frequently take possession of our walls of stone and brick, and of our court-yards, paved with granite, are in many instances only a provisional culture. Nature, who always proceeds from harmony to harmony, till she has attained the point of perfection which she proposes to herself, first sows all abandoned soils with grasses and herbage of different species, till she can raise upon them vegetables of a superior order. In rude districts, where nothing but green turf now meets the eye, our descendants may perhaps behold stately forests. We shall take, as usual, a

superficial view of the wonderfully ingenious means she employs to prepare these vegetable progressions; and shall presently obtain a glimpse not only of the elementary relations of plants, but likewise of those that prevail between their different classes, and extend even to animals. Vegetables, the most contemptible in the eyes of man, are frequently the most necessary in the order of the creation.

The principal means employed by Nature to promote the growth of plants of every species are the thorny plants. It is extremely remarkable, that plants of this kind are the first that appear in fallow lands, or in forests that have been felled. They are, in fact, well adapted to favor the vegetation of other plants, because their leaves, with deep incisions, like those of the thistle; or their sprigs bent into the form of an arch, like those of the bramble; or their branches horizontal and interlaced, like those of the black thorn; or their boughs bristled with thorns and destitute of leaves, like those of the sea-rush, leave around them many intervals where other vegetables may shoot up and find protection from the teeth of most quadrupeds. Nurseries of trees are frequently contained in their bosom. Nothing is more common in coppices than to see a young oak rising from the midst of a tuft of brambles, which covers the earth around it with clusters of prickly flowers; or a young pine starting out of a yellow brake of marine rushes.

When these trees have once attained a certain growth, they stifle by their shade those thorny plants, which subsist only on the skirts of the woods where they have air sufficient to vegetate. But in this situation they are still the means of spreading them from year to year over the plains. Thus the thorny plants are the first cradles of the forests, and the greatest enemy to the agriculture of man is the bulwark to that of Nature.

Man has, however, imitated, in this respect, the procedure of Nature, for when he is desirous of protecting the

seed that is just springing up in his garden, he takes the precaution to cover it with some kind of prickly branches. To me it appears probable that there is not a heath but what would in time become a forest, if the neighbouring inhabitants were to refrain from driving their flocks thither to pasture, as the sheep crop the young shoots of trees as fast as they spring up from beneath the bushes. This I conceive to be the reason why the high mountains of Spain, of Persia, and of other parts of the world are destitute of trees; because in summer numerous flocks are driven to them, and roam over their different chains. I am persuaded that, in the early ages of the world, these mountains were covered with forests, which were destroyed by their original inhabitants, and that these places, though now naked deserts, would resume their ancient clothing were the practice of pasturing cattle upon them to be discontinued. It is very remarkable that these elevated regions are sown with prickly plants like our heaths. Don Garcias de Figueroa, ambassador from Spain to the court of Shah Abbas, king of Persia, relates, in the narrative of his travels, that the other mountains of Persia which he crossed, and on which the Turcomans are incessantly wandering about, for the purpose of pasturing their flocks, were covered with a kind of prickly shrub, which grows there in the most parched situations. These same shrubs afforded a retreat to great numbers of partridges. On this subject we shall observe, that Nature more particularly employs birds to sow prickly plants in the most inaccessible situations. Thither they are accustomed to retire during the night, and there they deposit with their dung the stony seeds of the blackberry, of the wild rose, of the barberry, and of most thorny shrubs, which, in consequence of relations equally admirable, are indigestible in their stomachs. Birds have likewise particular harmonies with those vegetables, as we shall see in the proper place. They not only find in them an abundant supply of food and shelter, but likewise down to line their

nests, as in the thistle and the cotton tree of America: so that if some of them seek security in the elevation of lofty trees, others find it in prickly shrubs. There is not a bush but what has its peculiar bird.

Independent of the plants proper for each situation, and which are there stationary, there are others which migrate, and are incessantly travelling round the globe. Of these peregrinations we may easily form a conception, if we suppose, what is actually the case, that many of them shed their seeds only when certain regular winds blow, or at certain revolutions of the currents of the ocean. Be this as it may, I think we ought to place in this number various plants known to the ancients, and which are not now to be found. Such is, among others, the celebrated *lazerpitium* of the Romans, who gave for its juice, which they denominated *lazer*, its weight in silver. This plant, according to Pliny, grew in the neighbourhood of the city of Corenum, in Africa, but it had become so scarce in his time, as no longer to be found there. He says that a single plant was discovered during the reign of Nero, and that it was sent to this prince as a very great curiosity. Our modern botanists imagine that the lazerpitium is the same plant as the silphium of our gardens; but, from the descriptions left us by the ancients, among others by Pliny and Dioscorides, it is evident that they are mistaken. For my part, I have no doubt that the lazerpitium is one of those vegetables destined to travel round the globe from east to west, and from west to east. It is perhaps at present on the western coast of Africa, whither the east winds may have wafted its seed; or, perhaps, by the revolutions of the west wind, it may have returned to the place where it was found in the time of Augustus; or may have been conveyed into the plains of Ethiopia, among people unacquainted with its boasted qualities. Pliny mentions several other vegetables equally unknown to us at the present day. We shall observe that these vegetable phenomena were contemporary with various

species of migratory birds, which have in like manner disappeared. It is ascertained that there are several classes of birds and of fishes which are incessantly migrating over the earth and in the sea; some in a certain revolution of days, others at the expiration of a certain number of years. Many plants may be subject to a similar destiny. This law extends even to the heavens, where some new star from time to time makes its appearance. It seems to me as if Nature had arranged her works in such a manner as to have always some novelty in reserve, to keep man in exercise. In the duration of the existence of the different beings belonging to each kingdom, she has established concerts of a moment, of an hour, of a day, of a month, of a year, of the life of a man, of the duration of a cedar, and perhaps of that of a globe; but this is undoubtedly known to the Supreme Being alone.

I am, however, persuaded that most migratory plants have one principal centre, such as a rugged rock, or an island in the midst of the sea, whence they extend themselves over the rest of the world. This leads me to deduce a powerful argument in favor of the recent creation of our globe. It is this—if it were of more ancient date, all the combinations of the propagation of plants by seed would have been completed in all its parts. Thus, for example, there would not be an uninhabited island or shore in the Indian sea but what would be planted with cocoa-trees, and sown with cocoa-nuts, which the sea conveys thither every year, and which it scatters alternately on their strands, by the variation of its monsoons and of its currents. Now, it is certain, that the radii of that tree, whose principal focus is at the Maldivia Islands, have not yet extended to all the islands of the Indian Ocean. The French philosopher Leguat, and his unfortunate companions, who were, in 1690, the first inhabitants of the small island of Rodriguez, situated one hundred leagues eastward of the Isle of France, found no cocoa-trees in it. But precisely at the period of their residence there, the sea threw upon the coast several cocoa-nuts in a state of germination: as

if Providence had designed to prevail upon them by this useful and agreeable present to remain on the island and to cultivate it. Francis Leguat, who was unacquainted with the relations which exist between seeds and the element in which they are designed to grow, was very much astonished that these fruits, weighing five or six pounds, should have performed a voyage of sixty or eighty leagues without being spoiled. He supposed, and he was right, that they came from the Island of St. Brande, situated to the north east of Rodriguez. These two islands, uninhabited from the creation of the world, had not yet communicated to each other all their vegetables, though situated in a current of the ocean which sets alternately in the course of the year six months towards the one, and six months towards the other.

Be this as it may, they planted these cocoa-nuts, which, in the space of a year and a half, shot up to the height of four feet. Such a signal blessing from heaven had not, however, the power of detaining them in the happy island. An inconsiderate desire of procuring women, hurried them away from it, in spite of the remonstrances of Leguat, and plunged them into a long series of misfortunes, which but few of their number survived. For my part, I entertain no doubt, that, had they reposed in Providence the confidence they ought, it would have sent them wives into their desert island, as it had sent thither the cocoa-nuts.*

But to return to the voyages of vegetables. All the combinations and all the versatilities of their seeds, must have been long since completed in the islands situated between the same parallels and in the same monsoons, if the world had been eternal. The double cocoa-nuts, the nurseries of which are in the Sechelles Islands, would have diffused themselves, and would have had time to grow on

* The translator is far from intending to weaken that confidence which ought, in every situation, to be placed in Divine Providence; but he cannot help thinking this hypothesis too extravagant to be passed over without remark. He is at least persuaded that the author will find few readers whose faith, in this particular, is as strong as his own. T.

the Malabar coast, on which the sea from time to time throws them. The Indians would have planted on their shores those fruits to which they ascribed virtues so astonishing, while the tree which bears them was so totally unknown to them, that only a few years ago they looked upon them as productions of the bottom of the sea, and for that reason denominated them marine cocoa-nuts. There are, in like manner, great numbers of other fruits whose primitive stocks are in the Moluccas, in the Philippines, in the islands of the South Sea, and which are utterly unknown on the coasts of the two continents, and even in the neighbouring islands, though they would undoubtedly have become objects of cultivation to their inhabitants, if the sea had been allowed time to cast up a sufficient number of them on their shores.

I shall not pursue this reflection any farther: but it evidently demonstrates the recent date of the world. If it were eternal, and not subject to the direction of a Providence, its vegetables would long since have undergone all the possible combinations of the chance which resows them. We should find all the different species in every situation where it is possible for them to grow. From this observation I deduce another conclusion, namely, that the author of Nature designed to connect mankind by a reciprocal communication of benefits, the chain of which is still far from being completed. Where is, for example, the benefactor of mankind who shall convey to the Ostiaks and the Samojedes, on the shores of Waigats Streights, the winter-tree of the Streights of Magellan, whose bark unites the taste of the clove, of pepper, and of cinnamon? And who is the man that shall carry to the Streights of Magellan the pea-tree of Siberia, to satisfy the cravings of the famished Patagonians? What a rich collection might Russia make not only of the trees which grow in the northern and southern regions of America, but of those, which, in every part of the world, crown the lofty, ice-covered mountains, whose elevated ridges have a tem-

perature approaching to that of her plains! Why does she not behold in her forests the pines of Virginia intermingled with the cedars of Lebanon? Why are not the desert shores of the Irtish annually covered with the same species of oats which feeds so many tribes on the banks of the rivers of Canada? She might not only assemble in her plains the trees and the plants of cold latitudes, but also a great number of the annual vegetables which grow during the course of a summer in hot and temperate latitudes. I know from experience that the heat of summer is as powerful at Petersburg as under the equator. There are, besides, in the north, situations which have forms adapted to afford shelter against the north winds, and to encrease the warmth of the sun, If the south has its icy mountains, the north has its reverberating vallies. I have seen one of these small vallies near Petersburg, at the bottom of which runs a stream that never freezes even in the midst of winter.

The rocks of granite scattered over Finland, and covering, according to the report of travellers, the greatest part of Sweden, of the shores of the Frozen Ocean, and the whole of Spitzbergen, are sufficient to produce the same temperature in many different places, and to moderate, in a considerable degree, the severity of the cold. Near Wiborg, in Finland, beyond the sixty first degree of latitude, I have seen cherry-trees exposed to the weather, though they are natives of the forty second degree, that is of the kingdom of Pontus, whence Lucullus conveyed them to Rome, after the defeat of Mithridates. The peasants of that province likewise cultivate tobacco, though it is a much more southerly plant, being a native of Brasil. It is, indeed, an annual plant, and does not there acquire any high flavor; for they are obliged to expose it to the heat of their stoves, to bring it to complete maturity. The rocks, however, with which Finland is covered, would undoubtedly present to the attentive observer reverberating situations capable of bringing it to a sufficient degree of maturity, without that

process. Near the town of Fredericsham I myself found upon a dunghill, under the shelter of a rock, a very lofty tuft of oats, producing from a single root thirty-seven ripe ears, without reckoning a great number of small shoots. I plucked it, with the intention of presenting it to her imperial majesty Catherine II. by my general M. de Bosquet, under whose orders, and in whose company I was making the tour of that province. It was likewise his intention; but our Russian attendants, careless like all slaves, contrived to lose it. He was extremely vexed, as well as myself. I cannot help thinking that such a beautiful tuft of grain, produced in a province considered at Petersburg as smitten with sterility on account of the rocks with which it is covered, and which procured it from ancient geographers the surname of *Lapidosa*, would have been as acceptable to her majesty, as the huge block of granite, which she afterwards caused to be conveyed from that country to Petersburg, to be formed into the base of the statue of Peter the Great.

I have seen, in Poland, several individuals cultivate the vine and the apricot with great success. M. de la Roche, agent to the prince of Moldavia, took me, when at Warsaw, to a small garden in the suburbs, which brought its cultivator a yearly profit of one hundred pistoles, though it did not contain thirty of those trees. One hundred and fifty years ago they were totally unknown in that country. The first was introduced into it by a Frenchman, valet de chambre to a queen of Poland. This man cultivated them a secret, and made presents of their fruit to the grandees of the country, pretending to have received them from France by the couriers of the court. These grandees did not fail to pay him handsomely for his presents; and this kind of commerce became for him the foundation of such an ample fortune, that his great-grand-children are at this day the most opulent bankers in that country.

What I have here said concerning the possibility of enriching Russia and Poland with useful vegetables, p[illegible] not only from a desire of making the best ack[illegible]

iedgment in my power for the gracious reception with which I was honored by the people of rank and the governments of those countries, when I was a stranger among them; but likewise because these suggestions are equally applicable to the improvement of France, the climate of which is more temperate. We have icy mountains which are capable of producing all the vegetables of the north, and reverberatory vallies in which most of those of the south might be raised. We ought not, according to our ordinary method, to render these kinds of culture general in a whole district, but establish them in some little sheltered spot or turning of a valley. The influence of these positions is of no great extent. Thus the celebrated Constantia vine of the Cape of Good Hope thrives only on a small tract of ground, situated at the foot of a hill, and the vines which are round about, and in the vicinity, produce grapes far inferior in quality, though they are the offspring of the same stock. This I know from personal experience. In France, these sheltered spots should be sought in situations where there are white stones, the color of which is best adapted to reverberate the rays of the sun. I even imagine that marl owes to its white color a portion of the heat which it communicates to the ground over which it is spread; for it reflects the rays of the sun with such power as to burn the first shoots of various kinds of grasses. This is, in my opinion, the reason why marl, which notwithstanding possesses within itself the principles of fecundation, kills most of the herbs which are accustomed to grow in the shade of corn, which is, in general, the most hardy of grasses. We ought farther to seek these exposures in the vicinity of the sea, and under the influence of its winds, which are so necessary to the vegetation of a great number of plants, that many of them will not grow in the interior of a country. Such, among others, is the olive-tree, which could never be made to thrive in the interior of Asia and America, though the latitude is in other respects favorable. Nay, I have

emarked that it produces no fruit in the islands and on shores where it is excluded from the sea-breezes. To this cause I ascribe the sterility of those planted in the Isle of France on its west coast, which is sheltered from the east winds by a chain of mountains. As to the cocoa-tree, it will not thrive between the tropics, unless it has, if I may so express myself, its roots in sea-water. It is, I believe, from inattention to these geographical situations, and to various others, that so many new articles of cultivation have failed in France and in our colonies.

Be this as it may, I think it possible to find in France an icy mountain with perhaps a reverberatory valley at its foot. The search for it would be a very agreeable employment, and the greatest utility might be derived from it. It mignt be converted into a public garden, which would exhibit the vegetation of a multitude of climates in a line less than fifteen hundred fathoms in height. We might there bid defiance to the heat of the dog-star, beneath the shade of cedars, on the mossy bank of a snow-born rivulet; and perhaps to the severity of winter, at the bottom of a valley, with a southern aspect, under palm trees, and in the midst of a field of sugar-canes. We might there naturalize the animals which are the companions of those vegetables. We should hear the reindeer of Lapland braying in the same valley to which we should see the peacocks of Java repairing to build their nests. This landscape would exhibit to our view a part of the tribes of the creation, and would present to us an image of the terrestrial Paradise, which, in my opinion, was situated in a similar position. In truth, I should wish that our enjoyments were extended as far as the study of Nature has pursued its researches.

It now remains for me to examine the harmonies which plants form with each other. It is these harmonies that embellish sites planted by the hand of Nature. They shall be the subject of the following section.

VEGETABLE HARMONIES OF PLANTS.

We are now going to apply to plants the general principles laid down in the preceding study, by examining in succession the harmonies of their colors and of their forms.

The verdure of plants, which is so agreeable to the eye, is the harmony of two colors opposite in their elementary generation; of yellow, which is the color of the earth, and of blue, which is the color of the heavens. If Nature had given to plants a yellow hue, they would have been confounded with the soil; and if she had dyed them blue, they would have been confounded with the sky and the waters. In the first case, all would have appeared earth; in the second, all would have appeared sea; but their verdure forms the most delightful contrasts between them and the grounds of that grand picture, as well as consonances highly agreeable with the yellow color of the earth, and with the azure of the heavens.

Green likewise possesses this advantage, that it harmonizes in an admirable manner with all the other colors: this proceeds from its being the harmony of two extreme colors. Painters of taste cover the walls of their cabinets of pictures with green stuffs, that the pictures, of whatever colors they may be, may detach themselves from this ground without harshness, and may harmonize with it, without confusion.*

Nature, not content with this first general tint, has employed it in spreading over the ground of her scene what painters call transitions: she affects a particular shade of

* Undoubtedly when they place on a green ground pictures of plants or landscapes, such pictures cannot appear to advantage upon it. In my opinion, there is a color much more favourable for the ground of a picture-gallery; I mean grey. This tint, formed of white and black, which are the extremes of the chain of colors, harmonizes with all the others without exception. Nature frequently employs it in the heavens and on the horizon, by means of vapors and clouds, which are generally of that color.

blueish green, which we term sea-green, in plants that grow in the vicinity of waters, and of the heavens. It is this shade which, in general, tinges those of the shores, as the reed, the willow, the poplar; and those of elevated situations, as the thistle, the cypress, and the pine: and which causes the azure of the rivers to harmonize with the verdure of the meadows, and the azure of the heavens with the verdure of the eminences. Thus by means of this light and fugitive tint, Nature diffuses delicious harmonies over the limits of waters and the profiles of landscapes; and it produces another magic effect upon the eye, by giving greater apparent depth to the vallies, and elevation to the mountains.

Another wonderful circumstance in this disposition is, that though she employs but one single color in arraying so many plants, she produces from it such a prodigious quantity of tints, that each of these plants has one peculiar to itself, and which detaches it sufficiently from its neighbour to be distinguishable from it: and each of these tints varies every day, from the beginning of spring, when most of them exhibit a kind of bloody verdure, to the last days of autumn, when they appear to be of various shades of yellow.

Nature, having thus harmonized the ground of her picture by a general color, has detached from it each vegetable in particular by means of contrasts. Those that are destined to grow immediately on the earth, on strands, or on dusky rocks, are entirely green, leaves and stem; as the greatest part of reeds, grasses, mosses, taper-trees, and aloes; such, on the contrary, as are intended to issue from amidst herbage, have stems of a brownish hue, like the trunks of most trees and shrubs. The elder, for example, which thrives in the midst of green turf, has stems of an ash grey; but the dwarf elder, which otherwise resembles it in every respect, and grows immediately on the ground, has them quite green. The mugwort, which grows along hedges, has a reddish stem, by which it is

easily distinguished from the neighbouring shrubs. Nay, in every genus of plants there are species, which, by their glaring colors, seem to have been designed to terminate the limits of their respective classes. Such, in the sorb genus, is the species called the Canadian service-tree, the branches of which are red like coral. Among the willow tribe, there are osiers whose scions are as yellow as gold but there is not a single plant which is not perfectly distinguishable from the ground that surrounds it, by its flowers and its fruits. It is impossible to imagine that so many varieties are the mechanical results of the color near which the bodies are placed; for example, that the blueish green of most of the mountain vegetables is an effect of the azure of the heavens. It is worthy of remark, that the blue color is not to be found, at least as far as I know, in the flowers or in the fruits of lofty trees, for, in that case, they would be confounded with the sky: but it is very common on the ground in the flowers of herbs, as in the corn-bottle, the scabiosa, the violet, the liverwort, the flower-de-luce, and others. On the contrary, the color of the earth is very common in the fruits of lofty trees, as in those of the chesnut, the walnut, the cocoa, the pine. Hence we may conclude that the point of view of this magnificent picture was taken from the eye of man.

Nature, after having distinguished the harmonic color of each vegetable by the contrasting color of its flowers and of its fruits, has followed the same laws in the forms she has bestowed on them. The most beautiful form, as we have already seen, is the spherical, and the most agreeable contrast it is capable of presenting, is when it is opposed to the radiating form. You will frequently find this form and its contrast in the aggregation of the flowers called radiated, as the daisy, which has a circle of small, white, divergent petals, that surround its yellow disk. It is found with different combinations in the corn-bottle, the aster, and an infinite number of other species. When the radiating parts of the flower are outermost, the spherical

parts are inward: this may be observed in those whose stamina are very long, and whose petals are segments of a circle, such as the flowers of the whitethorn, of the apple-tree, and of most rosaceous and liliaceous plants. Sometimes the contrast of the flower is with the surrounding parts of the plant. The rose is one of those in which it is most strongly marked; its disk is formed of beautiful spherical portions; its calix is bristled with beards, and its stalk with thorns.

When the spherical form is placed in a flower, between the radiating and parabolic form, there is then a complete elementary generation, the effect of which is always highly agreeable; and it is this which is produced by most of the flowers that have just been mentioned, by the profiles of their calices, which terminate their projecting stems. The flower-girls are so sensible of this advantage, that they ask a much higher price for a single rose on its stalk, than for a large nosegay of the same flowers, especially if there are on it a few buds that present the charming progressions of flowering. But Nature is so vast, and my incapacity so great, that I shall confine myself to a mere glance at the contrast arising from the simple opposition of forms. It is so universal that Nature has given it to plants which had it not in themselves, by opposing them to others that have a configuration entirely different.

Species opposite in forms are almost always associated. When you find an aged willow on the bank of a river, which is not worn away, you frequently see a great convolvulus covering the radiated foliage of the tree with its heart-shaped leaves, and its white bell-formed flowers, compensating the want of apparent blossom, which Nature has denied to that tree. Various species of bind-weed produce similar harmonies with different kinds of tall gramineous plants.

The plants, called climbing, are diffused over the whole vegetable kingdom, and are assigned, I believe, to every vertical species. They have many different methods o.

laying hold of them, which would alone merit a separate treatise. Some turn in spirals round the trunks of forest trees, as the honey-suckle; others, as pease, have hands with three to five fingers, with which they grasp the shrubs. It it exceedingly remarkable that they are not furnished with these hands till they have attained the height at which they begin to want them for their support. Others, like the gourd, fasten themselves by means of corkscrews; others form a simple hook with the stalk of their foliage, as the nasturtium; and the carnation does the same with the extremity of its leaf. We support these two beautiful flowers in our gardens with sticks; but it would be a problem worthy the research of the botanist, to ascertain the auxiliary plants as they might be called, to which they are designed to unite themselves in the countries of which they are natives. By their combinations we might form charming groups.

I am persuaded that there is not a vegetable which has not its opposite, in some part of the world: their mutual harmony is the cause of the secret pleasure which we experience in the rural situations where Nature is permitted to combine them. The fir rises in the forests of the north like a lofty pyramid of a dark green color, and with motionless attitude. Near this tree you almost always find the birch, which grows to the same height, in the form of an inverted pyramid, of a lively green, and whose moveable foliage is incessantly playing with every breath of wind. The round-leaved clover delights to grow in the midst of slender-grass, and to adorn it with its clustering flowers. Nay, I believe that Nature has made such deep incisions in the leaves of many vegetables only to facilitate this kind of alliances, and to afford a passage to grasses, whose verdure and whose delicate stalks form with them an endless variety of contrasts. Of this we see numberless examples in uncultivated grounds, where the tufts of grasses pierce through the large plants of the thistle and other vegetables. Another purpose of this arrangement is that the grasses,

which are the most useful of all vegetables, may receive portion of the waters of heaven through the broad foliage of those privileged children of nature, which would stifle every thing around them, were it not for those deep incisions. Nature has made nothing for pleasure alone, unconnected with any motive of utility; this appears to me to be so much the more plainly expressed, as the incisions of the leaves are much deeper and more common in plants and shrubs which rise to no great height from the ground, than in trees.

The harmonies resulting from contrasts exist even in the waters. The reed, on the banks of rivers, raises erect into the air its radiated leaves and its embrowned stem, while the nymphæa spreads at its feet its broad heart-shaped leaves, and its gold-coloured roses; the one presents on the waters a palisade, and the other a platform of verdure. Similar oppositions are found even in the most dreary climates. Martens of Hamburg, who published a very good account of Spitzbergen, says, that when the seamen of the vessel in which he navigated along its coasts weighed the anchor, they almost always drew up with it a very broad leaf of alga marina, six feet in length, and attached to a stalk quite as long; this leaf was smooth, of a brown color, with black spots, striped with two white stripes, and shaped n the form of a tongue. He calls it the plant of the rock. But what is very remarkable, it was generally accompanied by a bushy plant, six feet long, resembling the tail of a horse, and composed of fibres so delicate, that, as he says, it might be denominated rock-silk. On those dismal shores, where the empire of Flora is so desolate, he found the scurvy grass and the sorrel growing together. The leaf of the first is rounded into the shape of a spoon, and that of the other is lengthened into the form of the head of an arrow. A skilful physician, whose name is Bartholin, has observed that the virtues of their salts are as opposite as their configurations: those of the former are alkalies, those of the latter acids; and from their union results what medical men term

neutral salt, and what they ought rather to call harmonic salt, the most powerful remedy that can possibly be employed against the scurvy, a disease which generally attacks those who visit these dreadful climates. For my part, I suspect that the qualities of plants are harmonic like their forms, and that whenever we find them agreeably and regularly grouped, a harmony as pleasing as what arises from the contrast of their figures must result from the combination of their qualities, for food, for health, and for pleasure. This is a presumption which I might support by the instinct of animals, which in browsing on the herbage, vary the choice of their aliments; but this consideration would lead me astray from my subject.

I should never come to a conclusion, were I to enter into a detail respecting the harmonies of numbers of plants, which we undervalue because they are feeble or common. Let us magnify them in idea to the size of trees, and the majesty of the palm would be eclipsed by the magnificence of their attitudes and proportions. Some, as the echium, rise, like superb chandeliers, leaving a vacancy round their centre, and extending towards heaven their prickly arms, covered throughout their whole length with girandoles of violet-colored flowers. The verbascum, on the contrary, spreads a drapery of broad leaves around it, and shoots from its centre a tall stem crowned with yellow flowers, as beneficial to the stomach as they are soft to the touch. The dark blue violet is contrasted in the spring with the gold cup and the scarlet lips of the cowslip. On the embrowned angles of the rock, in the shade of ancient beech-trees, the fungus, white and round as the pieces of a draught-board, rises from amidst the beds of moss of the most beautiful green.

The class of fungi alone presents a multitude of consonances and contrasts to which we are strangers. It contains, in the first place, a greater number of varieties than any other vegetable of our climates. Sebastian le Vaillant reckons up one hundred and four species in the environs

of Paris, exclusive of the fungoids, which furnish at least a dozen more. Nature has scattered them over most shady situations, where they frequently form the most extraordinary contrasts. Some of them thrive only on naked rocks, where they exhibit the appearance of a forest of small filaments, each surmounted by its particular capital. Some grow on substances the most abject, with forms the most heavy: such is that which thrives upon horse-dung, and which from its resemblance to a Roman cap, has been distinguished by that name. Others present agreeable consonances; such is that which grows at the foot of the alder, in the form of a cockle. Which of the Nymphs planted this shell at the foot of the tree of rivers? The destiny of this numerous tribe appears to be attached to that of the trees, each of which has a fungus appropriated to it, and rarely found elsewhere: such are those which grow only at the foot of the plumb-tree and of the pine. In vain the heavens pour down torrents of rain; the fungus, sheltered by its umbrella, receives not a single drop. It derives the whole support of its life from the earth, and from the mighty vegetable to whose fortune it has united its own: like the humble attendants on the great, the fungi extract their subsistence from the super-abundance of others; they grow under the shade of the powers of the forest, and live on the superfluity of their magnificent banquets.

Other vegetables exhibit oppositions of strength to weakness in another way, and consonances of protection still more distinguished. Those, like the haughty noble, leave their dependants at their feet; these carry them in their arms, and place them upon their heads. They frequently receive the reward of their generous hospitality The lianes, which in the Antilles attach themselves to the trees of the forest, defend them against the fury of the hurricane. The oak of Gaul has been more than once the object of popular veneration, for having borne the misletoe among its branches. The ivy, the friend to monuments

and tombs—the ivy, with which great poets who conferred immortality, were formerly crowned, sometimes covers with its foliage the trunks of the most stately trees. It is one of the strong evidences of the vegetable compensations of Nature, for I do not recollect to have ever seen it on the trunk of the pine, the fir, or any tree which retains its foliage all the year round. It clothes only such as are stripped by the hand of winter. The emblem of a generous friendship, it attaches itself only to the unfortunate, and even when death has smitten its protector, it still renders to him the honors of the forest in which he lives no longer: it makes him revive, by decorating his manes with garlands of flowers and festoons of everlasting verdure.

The greatest part of the plants that grow in the shade have the most vivid colors; thus the mosses exhibit the brilliancy of their emerald green on the dusky sides of the rocks. In the forests, the fungi and agaries are distinguished by their colors from the roots of the trees on which they grow. The ivy detaches itself from their grey barks by its polished verdure; the misletoe displays its branches of a yellow green, and its fruits resembling pearls amidst their thick foliage. The aquatic convolvulus exhibits its large white bells on the trunk of the willow; the virgin vine clothes the ancient towers with verdure, and in autumn its gold and purple foliage seems to fix upon their embrowned walls the rich colors of the setting sun. Other plants, entirely concealed from the view, discover themselves by their perfumes. It is thus that the obscure violet allures the hand of the lover into the midst of the thorny bushes. Thus is verified on every side that great law of contrasts which governs the world: no aggregation is in plants the effect of chance.

Nature has established, among the numerous tribes of the vegetable kingdom, a multitude of habits, the end of which is unknown to us. There are plants, for example, the sexes of which are in different individuals, as in the

animal creation. There are others which are always found united in several clusters, as if they were fond of living in society. Others, on the contrary, are almost always found alone. I presume that many of these relations are connected with the manners of many of the birds which live on their fruits and resow them. The herbs in the meadows frequently represent the appearance of the trees of the forests: some in their foliage and their proportions resemble the pine, the fir, the oak; nay, I believe that every tree has its corresponding herb. It is by this magic that small spaces exhibit to us the extent of a large district. If you are in a grove of oaks, and perceive on a neighbouring hillock tufts of germander, the foliage of which resembles them in miniature, you will enjoy all the effects of a perspective. These diminutions of proportion extend from trees down to mosses, and are the causes, in part, of the pleasure which we feel in rural scenes, when Nature has had leisure to arrange her plans. The effect of these vegetable illusions is so certain, that if the ground be cleared, the spot, stripped of the plants natural to it, appears to be much less extensive than before.

Nature likewise employs diminishing shades of verdure, which, being lighter at the summits of trees than at their base, causes them to appear more lofty than they really are. She has also assigned the pyramidal form to many mountain trees, for the purpose of augmenting the apparent elevation of their site: this is observable in the larch, the fir, the cypress, and many other plants which grow on eminences. She sometimes unites in the same place the effects of seasons and of climates the most opposite. She clothes, in hot countries, whole sides of mountains with the vegetable called the ice-plant, because it seems to be entirely covered with flakes of ice: you would imagine that in the midst of summer Boreas had blown upon it the chilling blasts of north. On the other hand, you find in Russia, in the heart of winter, mosses, which, from the red and smoky color of their flowers, seem to have been exposed

to the action of fire. In our rainy climates, she crowns the summits of the hills with broom and rosemary, and the tops of ancient turrets with wall-flowers. In the midst of the most gloomy day, you would imagine that you beheld the rays of the sun shining upon them. In another place she produces the effects of wind amidst the most profound calm. In America, if a bird alights on a tuft of sensitive-plants, it is sufficient to set in motion the whole stripe, which sometimes extends nearly half a mile. The European traveller pauses, and is astonished to find the air tranquil and the herbage in motion. In our woods, I have myself sometimes taken the murmuring of the aspens and poplars for that of the brooks. Oftener than once, seated beneath their shade, on the skirt of a meadow, whose herbage undulated with the breeze, this two-fold tremulous motion has transfused into my blood the imaginary coolness of the waters. Nature frequently employs the vapors of the atmosphere to give a greater extent to our landscapes. She spreads them over the depths of vallies, she stops them at the windings of rivers, permitting the spectator to catch a glimpse at intervals of their long channels, illumined by the sun. She thus multiplies their plans, and prolongs their extent. She sometimes withdraws this magic veil from the bottom of vallies; and rolling it over the neighbouring mountains where she tinges it with vermillion and with azure, she confounds the circumference of the earth with the vault of heaven. It is thus that she employs the clouds, as evanescent as the illusions of life, to raise us towards heaven; that she diffuses amid her mysteries the ineffable sensations of infinity, and that she withdraws from our senses the perception of her works, that she may convey to our minds a more profound impression of them.

ANIMAL HARMONIES OF PLANTS.

Nature, having placed on a soil formed of fragments insensible and lifeless, vegetables endowed with the prin-

ciples of life, of growth, and of generation, gave to those beings, which, together with these faculties possessed the power of motion, dispositions to inhabit them, passions to derive their nourishment from them, and an instinct to make a proper choice: these are animals. In this place I shall treat only of the most common relations which they have to plants; but were I to attempt to describe those which their numberless tribes have to the elements, to each other, and to man, I should disclose a multitude of scenes still more worthy of admiration.

In an order completely new, Nature has made no alteration in her laws; she has established the same harmonies and the same contrasts between animals and plants, as between plants and the elements. It appears extremely natural to our feeble reason, and consequently to the great principles of our sciences, which assign so much power to analogies and to physical causes, that so many sensible beings which are produced in the midst of verdure, should be, in process of time, affected by it. The impressions of their parents, together with those of their infancy, which serve to explain so many circumstances relative to the human species, acquiring in them increased strength from generation to generation, by new tints, ought at length to produce oxen and sheep, green as the grass on which they feed. We have observed in the preceding Study, that, as vegetables were detached from the ground by their green color, so the animals, which live among the herbage are distinguished from it, in their turn, by their dusky colors; and that those which live on the dusky bark of trees, or on other dark grounds, are clothed with brilliant colors, and sometimes with green.

On this subject we shall remark that several species of the birds of India, which reside among the foliage of the trees, as the greatest part of the parrots, many of the humming-birds, and even of the turtle-doves, are of the most beautiful green: but independently of the spots and marbling, white, blue, and red, which distinguish their different tribes, and which

render them perceptible at a great distance in the trees, the brilliant green of their plumage detaches them to great advantage from the dull and embrowned verdure of those southern forests. We have already seen that Nature employs this general medium of weakening the reflection of heat; but that she might not confound the objects of her picture, if she has darkened the ground of the scene, she has bestowed on the actors more brilliant dresses.

It would appear that Nature has associated the species of animals invested with the most pleasing colors, with the species of vegetables whose flowers are the least vivid, by way of compensation. There are much fewer brilliant flowers between the tropics than in the temperate zones; but to make amends, the insects, the birds, and even quadrupeds, as various species of monkies and of lizards, have the most lively colors. When they rest on the vegetables peculiar to themselves, they form the most beautiful contrasts, and the most delightful harmonies. I I have sometimes stood still, in the islands, to observe the little lizards that live on the bark of trees, where they catch flies. They are of the most beautiful apple-green, and have on their backs a kind of characters, resembling Arabic letters, of the most vivid red. When a cocoa-tree had several of them scattered over its stem, no Egyptian obelisk of porphyry could appear to me so mysterious, so magnificent.* I have likewise seen flocks of small birds, called Cardinals, because they are quite red, alighting on bushes whose verdure was blackened by the sun, and to which they gave the appearance of girandoles of lamps. Father du Tertre says, that in the Antilles there in not a more brilliant spectacle than to see coveys of aras settling on the summit of a palm-tree. The blue, the red, and the

* They have sometimes furnished me with an explanation of the moral sense of the hieroglyphics engraved on the obelisks of Egypt, in honor of her conquering sovereigns; on beholding the characters traced upon them on the right and on the left, with heads, snouts, and paws, they reminded me of the diminutive fly-catchers of my palm-trees.

yellow of their plumage, cover the branches of the flowerless tree with the most superb enamel. Harmonies nearly similar may be observed in our climates. The goldfinch, with his red head and wings bordered with yellow, appears at a distance on a bush like the flower of a thistle in which he was hatched. You would sometimes take the slate-colored wagtail, resting on the extremity of the leaf of a reed, for the flower of the iris.

It would be highly curious to collect a great number of these oppositions, and of these analogies. They would lead us to a discovery of the plant peculiarly adapted to each animal. Naturalists have paid no attention to these adaptations: those who have written the history of birds, have classed them by their feet, their bills, and their nostrils. They sometimes mention the seasons in which they appear, but scarcely ever the trees on which they live. None but those, who, in making collections of butterflies, are frequently obliged to seek them in the state of the aurelia, or caterpillar, have ever thought of distinguishing those insects by the names of the vegetables on which they found them. Such are the caterpillars of the milk-thistle, of the pine, of the elm, and many more, which they discovered to be peculiar to those vegetables. But there is not any animal which may not be referred to some plant peculiarly adapted to its wants.

We have divided the plants into aërial, aquatic, and terrestrial, in the same manner as the animals themselves are divided, and we have found in the two extreme classes invariable concordances with their elements. They may be farther divided into two classes, into trees and herbs, as animals likewise are into quadrupeds and into volatiles. Nature has not associated the two kingdoms in consonances, that is by attaching great animals to great vegetables: but she unites them by contrasts, associating the class of trees with that of small animals, and that of herbs with the great quadrupeds: and by these oppositions she

confers adaptations of protection on the feeble, and of convenience on the powerful.

This law is so general, that I have remarked that in every country where there is no great variety in the species of grasses, those of the quadrupeds which live upon them are few in number; and that wherever the species of trees are multiplied, those of volatiles are likewise numerous. The truth of this observation may be ascertained by consulting the herbaries of various parts of America, among others, those of Guiana and of Brasil, which afford few varieties of grasses, but a great number of trees. It is well known that those countries have, in fact, few indigenous quadrupeds, and that, on the contrary, they are peopled with an infinite variety of birds and of insects.

If we cast a glance on the relations of grasses to quadrupeds, we shall find that, notwithstanding their apparent contrast, a multitude of real correspondencies exists between them. The moderate elevation of grasses places them within reach of the jaws of quadrupeds, whose heads are in a horizontal position, and frequently inclined towards the ground. Their loose sheaves seem formed to be laid hold of by broad and fleshy lips, their delicate stems to be easily cut by incisive teeth, and their farinaceous seeds to be easily bruised by the grinders. Besides, their bushy tufts, which are elastic, without being ligneous, afford soft litter for ponderous bodies.

If, on the other hand, we examine the conformities which exists between trees and birds, we shall see that the branches of trees are easily grasped by the four claws of most birds, which Nature has disposed in such a manner that there are three before and one behind, that they may be able to lay hold of the boughs as with hands. Besides, the birds find in the different stages of the foliage, a shelter against the rain, the sun, and the cold, towards which purpose the thickness of the trunks still farther contributes. The cavities formed in these last, and the mosses that grow upon them, afford lodgments for their nests, and materials

for lining them. The round, or oblong seeds of the trees are adapted to the form of their bills. Those that bear fleshy fruits, are frequented by birds which have bills pointed or curved like a pick-axe. In the islands of the regions situated between the tropics, and on the banks of the great rivers of America, most of the maritime and fluviatic trees, among other various species of palm-trees, bear fruits inclosed in very hard shells, that they may be capable of floating on the waters, which re-sow them in distant parts; but even this covering is not sufficient to protect them from the birds. The different tribes of parrots which inhabit them, and of which there is, I believe, a particular species assigned to every species of palm-tree, find means to open their cases with their crooked bills, which pierce like awls, and squeeze like pincers.

Nature has likewise formed animals of a third order, which find in the rind or in the flower of a plant, as many accommodations as a quadruped enjoys in a meadow, or a bird in an entire tree: I mean insects. Some naturalists have divided them into six great tribes, which they have characterized according to their custom, though to very little purpose, by Greek names. They class them into coleopterous, or insects with cases, as the scarabei, to which belong our May-bugs, or cockchafers; hemipterous, or half-cased, as the kermes among gall-insects; tetrapterous, or with four mealy wings, as butterflies; tetrapterous, with four naked wings, as bees; dipterous, or with two naked wings, as common flies; and apterous, or without wings, as the ant. But these six classes have a multitude of divisions and subdivisions, which associate species of insects the most discordant in forms and instincts, and separate many others between which there exists a striking analogy.

Be this as it may, this order of animals appears to be particularly partial to trees. Pliny observes that ants are extremely fond of the seeds of the cypress. He says that they attack the cones which contain them, when they half

open on arriving at maturity, and leave not a single seed behind; and he considers it as a miracle of Nature that an insect so diminutive should destroy the seed of one of the largest trees in the world. In my opinion, we shall never establish a real order among the different tribes of insects, and derive from the study of them that utility and pleasure of which it is susceptible, unless we refer them to the different parts of vegetables. Thus we might associate with the nectar of flowers the butterflies and the bees, which are furnished with tubes for sucking their juices; with their stamina, the flies, which, like bees, have cavities scooped out of their hairy thighs for collecting the powder; and four wings to carry off their booty; with the leaves of plants, the common fly and the gall insect, which have pointed and hollow piercers, for the purpose of making incisions, and drinking their fluids; with the seed, the scarabei, as the weevil, which is designed to bury himself in it, to live upon its flour, and is provided with wings, inclosed in cases, to secure them from injury, and with rasps, to open himself a passage; with the stems, the worms, which are entirely naked, because they have no occasion for clothing in the substance of the wood, that shelters them on every side, but are furnished with augers, with which they sometimes effect the destruction of whole forests; finally, with the wreck of every species, the ants, which have pincers, and the instinct of proceeding in numbers to cut to pieces and to carry away every thing that suits their purpose. The dessert of this vast vegetable banquet is washed by the rains into the rivers, and is thence hurried along into the sea, where it presents a new order of relation to the fishes. It is worthy of remark that the most alluring baits which can be offered to them, are obtained from the vegetable kingdom, and in particular from seed, or from the substances of plants possessing the aquatic characters which we have indicated; such as the rush of Smyrna, the juice of the milk-thistle, the Celtic spikenard, cummin, aniseed, the nettle, marjoram, the root

of the birth-wort, and the seed of hemp. Thus the relations of these plants to the fishes confirm what we have advanced concerning the relations of their seed to the waters.

By referring the various tribes of insects to the different parts of plants, we should discover the reasons that have induced Nature to give those diminutive animals figures so extraordinary. We should then learn the uses of their implements, most of which are still unknown to us; and we should have new occasion to admire the divine intelligence, and to improve our own. On the other hand, this knowledge would diffuse the clearest light over many parts of plants, with the use of which botanists are unacquainted, because they have consonances only with animals. I am persuaded that there is not a single vegetable which has not at least one individual, out of each of the six general classes of insects, acknowledged by naturalists. As Nature has divided each genus of plants into various species, to render them capable of growing in different situations, so she has likewise divided each genus of insects into various species, to enable them to inhabit different species of plants. For this reason she has painted and numbered, in a thousand different but invariable ways, the almost infinite divisions of the same branch. For example, we find constantly on the elm the beautiful butterfly called, from the richness of its color, gold-brocade. That which is distinguished by the appellation of the four omicrons, which lives I know not where, always produces descendants bearing four impressions of that Greek letter on their wings. There is a species of bee with five claws, which lives only on radiated flowers; without those claws, she could not cling to the plane mirrors of those flowers, and load herself from their stamina as easily as the common bee, which usually labors at the bottom of such whose corralla is deep.

I am far, however, from imagining that any one plant nourishes in its different varieties all the collateral branches

of one family of insects. On the contrary, it is my opinion, that each genus of these last is much more extensive than the genus of plants which serves for its principal basis. In this Nature manifests another of her laws, in conformity to which she has made whatever is best the most common. As the animal is of a superior nature to the vegetable, the species of the first are more numerous, and more widely diffused than those of the second. For example, there are not sixteen hundred species of plants in the environs of Paris; but nearly six thousand species of insects are enumerated in the same compass. I presume, therefore, that the different tribes of plants cross with those of animals, which renders their species susceptible of different harmonies. Of this some idea may be formed by the variety of tastes in birds of the same family. The black-headed linnet builds among ivy; the red-headed in walls, in the neighbourhood of hemp-fields; and the brown linnet on trees near the highway, where she constructs her nest with horse-hair. In our climates are enumerated a dozen species of that bird, each of which has its particular department. Our different species of larks are also assigned to different situations, to woods, to meadows, to heaths, to cultivated lands, and to the shores of the sea.

Very interesting observations may be made on the duration of vegetables, which is unequal, though they are subject to the influence of the same elements. The oak serves as a monument to nations, and the nostoc, which grows at its feet, lives but a day. All I can say on this subject in general is, that the period of their decay is not regulated by that of their growth; nor is the time of their fecundity proportioned to their weakness, to the climates, or to the seasons, as has been asserted. Pliny mentions holm-oaks, plane-trees, and cypresses which existed in his time, and which were more ancient than Rome, that is, more than seven hundred years old. He farther says, that there were still to be seen near Troy, around the tomb of Ilus, oaks which were growing on the spot when Troy

obtained the name of Ilium, and which must consequently have been of much higher antiquity than the former. I have seen in Lower Normandy an aged yew planted in the time of William the Conqueror: it is still crowned with verdure, though its trunk, cavernous and hollow through and through, resembles the staves of an old cask. There are even bushes which appear to be immortal. In different parts of France there are hawthorns which the devotion of the common people has consecrated by images of the Blessed Virgin, which have existed for ages, as may be ascertained by the inscriptions on the chapels erected in their vicinity. In general, however, Nature has proportioned the duration and the fecundity of plants to the necessities of animals. Many plants perish as soon as they have shed their seed, which they consign to the winds: there are some, as mushrooms, which live only a few days, like the species of flies that feed upon them. Others retain their seed all the winter through, for the use of the birds, like the greatest part of bushes. The fecundity of plants is not proportioned to their diminutive size, but to the fecundity of the animal species for whose food they are destined. The pannic, the smallest millet, and several other gramineous plants, so useful to animals and to man, produce beyond comparison more seed than many plants much larger and much smaller than themselves. There are many which perpetuate themselves by their seed once a year; but the chick-weed is renovated by its seed seven or eight times, without being interrupted even by winter. It produces ripe seed six weeks after it has been sown. The capsule which contains them is inverted towards the ground, opens, and abandons them to the winds and the rains, which sow them again in every direction. This plant affords sustenance, at every season of the year, to the small birds of our climates. Thus Providence is so much the more powerful in proportion to the weakness of the creature.

Other plants have relations to animals the more affecting in proportion as the climates and the seasons seem to

exercise a greater degree of severity towards the latter. If these conformities were thoroughly investigated, they would explain all the varieties of vegetation in every latitude, and in every season. Why, for example, are most of the trees of the north stripped of their leaves in winter, and why do those of the south retain theirs all the year round? Wherefore, in defiance of the cold of the winters of the north, does the fir there remain covered with verdure? It is difficult to discover the cause of this, but the end is extremely obvious. If the birch and the larch of the north shed their leaves at the approach of winter, it is to furnish litter to the beasts of the forests; and if the pyramidal fir there retains its foliage, it is for the purpose of affording them a shelter amidst the snows. That tree then presents to the birds the mosses that are suspended from its branches, and its cones filled with ripe kernels. Groves of service-trees frequently display for them in the vicinity, brilliant clusters of scarlet berries. In the winters of our climates various ever-green shrubs, as the ivy, the privet, and others, which continue covered with black or red berries, that form a striking contrast with the snow, as the hawthorn and the eglantine, present to winged animals both habitation and food. In the regions of the torrid zone, the earth is bespread with fresh lianes, and shadowed by trees with broad foliage, beneath which the animals find a cool retreat. The very trees of those climates seem afraid of exposing their fruits to the scorching rays of the sun; instead of erecting them like cones, or covering with them the circumference of their heads, they frequently conceal them under a thick foliage, and bear them attached to their trunks, or to the base of their branches, like the palms of every species, the papaw, and a multitude of others. If their fruits invite not the animals externally by vivid colors, they however call them by sounds. The heavy cocoa-nut, in falling from the summit of the tree that bears it, makes the earth resound to a considerable distance. The black pods of the *caneficier*, when ripe and agitated by the wind, produce, in clashing toge-

ther, a noise resembling the clack of a mill. When the greyish fruit of the genipa, of the West Indies, falls from the tree in a state of maturity, it cracks upon the ground with a noise equal to the report of a pistol. At this signal undoubtedly more than one guest hastens to seek a repast. This fruit seems to have been particularly designed for the land-crabs, which are extremely fond of it, and soon grow fat on this kind of food. It would have been of little use to them to see it on the tree, which they are incapable of climbing; but they are apprized of the moment when it is proper for food, by the noise of its fall. Other fruits, as the *jacq* and the *mangue*, affect the olfactory organs of animals at such a great distance, that you may smell them more than three quarters of a mile off, when the wind blows towards you. This property of emitting a very strong smell is likewise common, I believe to such of our fruits as are concealed by their foliage, as the apricot. There are other vegetables which never manifest themselves, if I may use that expression, to animals, but in the night. The jalap of Peru, or the great night-shade, opens its strongly scented flowers only in the dark. The flower of the nasturtium, which is of the same country, emits, in the dark, a phosphoric light, observed in the perennial species by the daughter of the celebrated Linnæus. The properties of these plants convey a pleasing idea of those charming climates, where the nights are sufficiently calm, and sufficiently luminous to establish a new order of society among animals. Nay, there are insects which need no pharos to guide them in their nocturnal peregrinations. They carry their lanterns with them; such are the luminous flies. They sometimes spread themselves in the groves of orange, papaw, and other fruit-trees, in the midst of the darkest night. They emit at once, by the repeated fluttering of their wings, a dozen streams of fire, that illumine the leaves and the fruits of the trees on which they settle with a golden and bluish light: then suddenly ceasing their movements, they plunge them again into total darkness. This kind of sport they continue the whole night

Sometimes they fly off in swarms of dazzling brilliancy, which rise into the air like the discharge of fire-works.*

If we were to study the relations which plants have to animals, we should discover the use of many of the parts which are considered as the productions of the caprice and of the confusion of Nature. The relations are so widely extended, that there is not a down on a plant, an intertexture of a shrub, a cavity, a color of a leaf, a thorn, but what has its utility. These wonderful harmonies may be remarked particularly in the habitations and the nests of animals. If, in hot countries, there are plants loaded with down, it is because there are moths entirely naked, which clip off the fleece, and convert it into clothing. On the banks of the Amazon is found a species of reed, twenty-five to thirty feet in height, the summit of which is terminated by a large ball of earth. This ball is the work of the ants,

* These splendid insects have the appearance of dirty-looking beetles, and their favorite retreat, till sun-set, is rotten wood. Father du Tertre, from whom the author has borrowed the above particulars, asserts, that in the West Indies, these insects are so numerous, that in dark nights the air seems full of lights, which shine and sparkle more than the stars in the sky.

Another species of these insects is described by Madame Merian, in her splendid history of the insects of Surinam, in which she gives an amusing account of an alarm she herself experienced before she was acquainted with their nature. "Before I knew," says she, "that these insects possessed the property of shining by night, the Indians once brought me several, which I put into a box. In the night they made so much noise, that they awoke and alarmed me considerably. I called for a light, unable to conceive whence the noise proceeded. Finding that it came from the box, I opened it; but being still more terrified on seeing a flame of fire issue from it, I dropped the box in my fright: but perceiving that a new flame appeared whenever any of the animals came out, I recovered from my apprehension, and again collected the insects, greatly admiring their splendid appearance." She adds that the light from one of these insects is sufficient to read by.

Dr. Darwin conjectures that the use of this remarkable property is to prevent the insects from flying against objects in the night, and to assist them in procuring sustenance in the dark From this opinion, however, other writers have dissented, and apparently with great justice, on this ground that very few of the numerous tribe of night-insects are endowed with this luminous property, and are, notwithstanding, capable of performing all their functions without it; and they have suggested that it is most probably intended to point out the sexes to each other, answering the same purposes as the voice in larger animals. T.

who retire to it in the rainy season, and during the periodical inundations of that river, they ascend and descend through the cavity of this reed, and live upon the wreck that floats around them on the surface of the water. It is, I presume, for the purpose of affording similar retreats to other small insects, that Nature has hollowed the stems of most of the plants of our shores. The Valisneria,* which grows in the stream of the Rhone, and bears its flowers on a spiral stem, which it lengthens out in proportion to the rapidity of the sudden swellings of that river, has holes perforated through the base of its leaves, the use of which appears very extraordinary. If you take up this plant by the root, and put it into a large vessel full of water, you perceive at the base of its leaves masses of a blueish jelly, which gradually lengthen into pyramids of a beautiful red. These pyramids are soon furrowed with flutings, which disengage themselves from the summit, invert themselves all round, and present, by their expansion, very handsome flowers, composed of radii purple, yellow, and blue. Each of these flowers gradually issues from the cavity, in which it is partly contained, and removes to a certain distance from the plant, to which, however, it remains attached by a filament. You then perceive each of the radii of which these flowers are composed, exercising a particular motion, which communicates a circular movement to the water and precipitates to the centre of each of them, all the small bodies that are floating around. If any shock disturb these wonderful expansions, every filament is instantly withdrawn, all the radii close, and all the pyramids return into their cavities, for the supposed flowers are polypuses.

There are in certain plants parts which are considered

* For an account of the Valisneria see the Travels of an anonymous English writer, performed in the year 1750, in France, Italy, and the islands of the Archipelago. They are replete with judicious observations of every kind. Consult, likewise, respecting the genepa and the various fruits, plants, and animals of tropical countries, the sprightly Father du Tertre, the patriotic Charlevoix, Jean de Laet, the historian, and all such travellers as have written on Nature, unbiassed by a spirit of system, and aided by the light of reason alone.

as the characters of uncultivated Nature, but which, like all the rest of her works, are evidences of the wisdom and providence of her author: such are prickles. Their forms are infinitely varied, especially in hot countries. Some are shaped like saws, like hooks, like needles, like the head of a halberd, and like caltrops. Some are round, like awls, triangular, like a piercer, or flat, like a lancet. There is no less variety in their aggregations. Some are ranged on the leaves in clusters, like those of the Indian fig; others in stripes, like those of the taper. Some are invisible, as those of the shrub of the West Indies, known by the denomination of captain's wood. The leaves of this formidable plant appear above smooth and shining; but they are covered underneath with very delicate prickles, which are placed in such a manner, that if you apply your hand to them ever so slightly, they will run into your fingers. There are other thorns which are placed only on the stems of plants; while others again are confined to the branches. In our climates we find scarcely any, excepting on bushes, and on a few plants: but in the Indies they are distributed over a great number of trees. Their very various forms and dispositions have relations, with most of which we are unacquainted, to the security of the birds, which live upon them. It was necessary that many of the trees of that country should be armed with thorns, because there are many quadrupeds that climb them for the purpose of eating the eggs and the young of birds, such as the monkey, the civet-cat, the tiger, the wild-cat, the opossum, the palm-rat, and even the common rat. The Asiatic acacia* affords to birds a retreat inaccessible to their enemies. It

* There is an Asiatic acacia to be seen in the beautiful garden situated near the gate of Chaillot, which formerly belonged to the virtuous Chevalier de Gensin. As to the name of the false acacia, given to the American acacia, I must observe that Nature produces nothing false. She has varied all her productions in every country, for the purpose of giving them relations adapted to the elements and to animals; and when we fail to find the characters which we have ascribed to them, it is not her works that we ought to charge with falsehood, but our systems.

bears no prickles on its trunk, or on its branches; but a the height of ten or twelve feet, exactly at the place where the branches of the tree shoot off, there is a ring composed of several rows of large thorns, from ten to twelve inches in length, and projecting nearly like the head of a halberd. With this rampart of spikes the tree is incircled, so that it is impossible for any quadruped to ascend. The American, or as it is improperly denominated the false acacia, has its thorns formed into hooks, and scattered over its branches, undoubtedly in consequence of some unknown relation of opposition to the species of quadruped that makes war upon the bird by which it is inhabited. There are in the West India Islands trees which have no prickles, but which are furnished with a much more ingenious protection. A plant, known in those countries by the appellation of the prickly thistle, a species of creeping taper, attaches its roots, resembling filaments, to the trunk of one of these trees, and runs over the ground all round it, crossing its branches one over the other, and forming a fence which no quadruped dares to approach. It bears, besides, a fruit very agreeable to the palate. On beholding a tree whose foliage is harmless, filled with birds that have constructed their nests in its branches, surrounded at its root by one of these prickly thistles, you are presented with the idea of one of those defenceless commercial cities apparently accessible, but the vicinity of which is protected by a citadel, which encompasses it with its long entrenchments. Thus the tree is on one side, and its thorn on the other.

The quadrupeds that live on the eggs of birds, would be reduced to great embarrassment, if Nature had not caused a vegetable of a very extraordinary form, which gives them access, to grow from the tops of these same trees. It is, in every respect, the opposite of the prickly thistle. It is a root two feet in length, as thick as a man' leg, pricked as if with a bodkin, and attached to a branch of the tree by a multitude of fibres, nearly in the same

manner as the prickly thistle adheres to the base of the trunk. Like the other, it derives its nourishment from the tree, and throws out ten or twelve large leaves in the form of a heart, three feet long and two broad, resembling those of the nymphæa. Father du Tertre calls it the false root of China. What is still more singular, it lets down perpendicularly from the top of the tree on which it is placed, several very strong cords, which are of the thickness of a quill throughout their whole length, and take root in the ground. The plant has no scent, but its cords smell like garlic. Undoubtedly when a monkey, or any climbing animal, perceives this large standard of verdure, notwithstanding the tree is surrounded at its foot by a rampart of thorns, this signal announces that he has a friend within the fortress: the smell of the cords which reach to the ground, directs him to the scaling ladder, even in the night, and while the birds are sleeping quietly in their nests, secure in the strength of their fortifications, the enemy obtains possession of the town through the suburbs.

In those countries the thorns of the trees protect the very insects. The bees there make honey in the aged trunks of thorny trees, hollowed by the hand of time. It is very remarkable that Nature, who has provided this resource for the bees of America, has withheld from them a sting, as if those of the trees were sufficient for their defence. To this cause it is I believe, to be ascribed, though no attention has been paid to it, that we have never been able to rear in the West Indies the bees of the country. Without doubt they refuse to inhabit domestic hives, because they consider themselves to be there insecure; but they might perhaps have been induced to remain, had the hives offered to them been covered and protected by thorns

If Nature employs thorns to defend the very flies from the insults of quadrupeds, she sometimes makes use of the same means to deliver quadrupeds from the persecution of common flies. She has, it is true, bestowed on those which are most exposed to it, manes and tails furnished with long

hair to drive them away; but the multiplication of these insects is so rapid in hot and damp seasons and countries, as to threaten every species of animal with destruction. One of the vegetable barriers opposed to them by Nature is the *dionæa muscipula*. This plant bears on the same branch opposite leaves, besmeared with a saccharine liquid, resembling manna, and bristled with very sharp prickles. When a fly settles on one of these leaves, they instantly close like the jaws of a rat-trap, and the fly is spitted in several different places. There is another species of the dionæa, which catches these insects with its flower. When a fly attempts to extract its nectar, the corolla, which is tubulated, shuts at the neck, seizes the insect by its proboscis, and thus puts the little plunderer to death. It grows in the Garden of Plants, at Paris. We shall observe that its flower, in the form of a cup, is white and streaked with red, and that these two colors universally attract flies, which manifest a great avidity of milk and blood.

There are aquatic plants which produce thorns, adapted to the catching of fishes. In the Garden of Plants may be seen an American vegetable called *martinia*, the flower of which has a very agreeable smell, and which from the form of its rounded leaves, the smoothness of their stalks and of its stems, has all the aquatic characters that have been already mentioned. It has likewise the peculiar property of transpiring so copiously, as to appear to the touch as if it had been sprinkled with water. I have therefore no doubt that, in its native soil, this plant grows on the brink of waters. But the husk that incloses its seed possesses a very extraordinary nautical character. It resembles a fish half dried, black and white, with a long fin on the back. The tail is very long, and terminates in a very sharp point, curved into the form of a fish-hook. This tail is commonly separated into two, and thus exhibits the appearance of a double hook. The configuration of this vegetable fish is perfectly similar in size and in form to the hook which is used at sea for catching the gilt-head; and at

the head of which is fixed the figure, in linen, of a flying-fish, excepting that the hook for gilt-heads has only one barb, while the pod of the martinia has two, which must render its effect the more infallible. This pod contains several black, shrivelled seeds, resembling flattened globules of sheep's dung.

As I possess few books on botany, I knew not of what country the martinia was a native; but, having recently consulted the work of Linnæus, I found that it came from La Vera Cruz. That celebrated naturalist finds in this shell no other resemblance than to a woodcock's-head; but if he had ever seen the hook for gilt-heads, he would not have hesitated a moment to acknowledge the similarity, especially as the extremity of this supposed beak bends back into two hooks, which prick like pins, and are, like the whole pod and the stalk which connects it with the stem, of a ligneous and horny substance, which it is extremely difficult to break. John de Laet informs us that the land of La Vera Cruz is on a level with the sea, and that its port, called St. John de Hulloa, is formed by a small island, no higher than the surface of the water; so that, as he tells us, when the tide is very high, it is entirely covered. These inundations are very common at the bottom of the Gulph of Mexico, as may be seen in the account which Dampier has given us of the Bay of Campeachy, which is in that vicinity. Hence I presume that the martinia, which grows on the inundated shores of La Vera Cruz, has certain relations of which we are ignorant, to the fishes of the sea, particularly as the seeds of several plants and trees, described by John de Laet, have very curious nautical forms

There is no occasion to seek among foreign plants the relations between vegetables and animals. The bramble, which affords shelter in our fields to so many small birds, has its prickles formed into hooks; so that it not only prevents the cattle from disturbing the birds in their retreats, but frequently seizes a lock of wool or of hair, as a reprisal for hostilities committed, and an indemnity for damages

sustained. Pliny asserts that this was the cause of the animosity between the linnet and the ass. That quadruped, whose palate is proof against prickles, frequently browses on the bush in which the linnet builds her nest. She is so terrified at his voice, that, on hearing it, says he, she throws down her eggs, and her young, when recently hatched, die of affright. But she makes war upon him in her turn, fixing herself on the scratches made by the thorns, and pecking the flesh to the very bone. It must be a curious spectacle to view the conflict between this diminutive and melodious bird, and the dull, braying, but inoffensive animal.

If we were acquainted with the animal relations of plants, we should possess much information relative to the instincts of beasts, to which we are yet strangers. We should know the origin of their friendships, and of their animosities, at least of those which are formed in society; for as to such as are innate, I do not think that their cause will ever be revealed to man. These are of a different order, and of another world. How so many animals have entered into life, harboring animosities, without having ever been offended; furnished with skill and industry without having served an apprenticeship; and endowed with instincts more infallible than experience? Wherefore has the electric power been conferred on the torpedo, invisibility on the cameleon, and even the light of the stars on a fly? Who taught the aquatic bug to glide over the waters, and to another species of bug to swim on its back; both the one and the other to catch the prey which hovers on the surface? The water-spider is still more ingenious. She incircles a bubble of air with her threads, places herself in the middle, and plunges to the bottom of the stream, where her bubble appears like a globule of quicksilver. There she ranges under the shade of the nymphæa, free from the dread of every foe. If in this species two individuals of different sexes chance to meet, and to please each other, the two globules approximating, unite into one, and the

wo insects are in the same atmosphere. The Romans, who constructed, on the shores of Baiæ, saloons under the waves of the sea, for the purpose of enjoying the coolness and the murmuring of the waters amid the heats of summer, were less skilful and less voluptuous. Were a man to combine in his person those wonderful faculties which are conferred upon insects, he would pass for a god among his fellow-creatures.

It is of some importance that we should at least be acquainted with the insects which destroy those that are injurious to us. We might learn from their wars to live in peace. The spider catches flies in nets; the formicaleo surprises the ant in a tunnel of sand; the four-winged ichneumon seizes the butterfly on the wing. There is another species of ichneumon so small and so cunning as to lay its eggs in the anus of the vine-fretter. Man might multiply at pleasure the families of insects which are useful to him, and might diminish the number of those which commit such depredations on his crops. The little birds o our groves tender him for this purpose services still more extensive and agreeable. They are all governed by the instinct of living near him and his flocks. A single species of them might frequently be sufficient to protect the cattle from the insects that torment them in summer. There is in the north a gad-fly denominated *Kourma* by the Laplanders, the *œstrus rangiferinus* of the learned, which torments the domestic rein-deer to such a degree as to force them away to the mountains, and sometimes even to cause their death, by depositing its eggs in their skin. On this subject many dissertations have, as usual, been written, but without leading to the application of any remedy. I am convinced that there must be birds in Lapland which would deliver the rein-deer from this dangerous insect, did not the Laplanders scare them away by the noise of their fire-arms. These weapons of civilized nations have overspread all our plains with barbarism. The birds formed for embellishing the habitation of man shun it, or approach

with mistrust. The use of fire-arms ought at least to be prohibited around peaceful flocks. When the birds are not scared away by the fowler, they follow their natural instincts. I have frequently seen in the Isle of France a species of starling, which is called martin, and was brought to that country from India, perch with the utmost familiarity on the backs and horns of cattle, to clean them of vermin. To this bird that island is at the present day indebted for the destruction of the locusts which formerly made such ravages there. In those districts of Europe where man still exercises some hospitality towards innocent birds, he sees the stork build her nest on the ridge of his house; the swallow flutter about in his apartments, and the wagtail, on the bank of the river, wheel round his sheep to protect them from the gnats.

The foundation of all this knowledge rests on the study of plants. Each of them is the focus of the life of the animals whose species are there collected in a point like the radii of a circle at their centre

No sooner has the sun, arrived at the sign of Aries, given the signal of spring to our hemisphere, than the rainy and hot wind of the south takes its departure from Africa, swells the seas, causes the rivers to overflow their banks, for the purpose of manuring with their mud the adjacent plains, overturns in the forests the aged trees, the decayed trunks, and every thing that presents any obstacle to future vegetation. It melts the snows that cover our fields, and advancing to the very pole, it batters to pieces and dissolves the prodigious masses of ice which winter had there accummulated. When this revolution, known all over the world by the name of the equinoctial wind, has taken place in the month of March, the sun turns night and day around our pole, so that not a single point in the whole northern hemisphere escapes his influence. With each parallel that he describes in the heavens, a girdle of new plants incircles the globe. Each of them appears successively at its allotted hour and station; it

receives at one and the same time the light in its flowers and the dew of heaven on its foliage. As it increases in growth, the various tribes of insects which it nourishes likewise make their appearance. At this period every species of bird resorts to that species of plant with which she is acquainted, there to build her nest, and to feed her young with the animal prey which it presents to her, as a substitute for the seeds which it has not yet produced. We soon behold the migratory birds arrive to take their portion. First comes the swallow to preserve our habitation from vermin, by constructing her nest around it. The quails, forsaking Africa, and skimming the billows of the Mediterranean, spread, in countless flocks, over the vast meadows of the Ukraine. The heath-cock pursues his course toward the north, even as far as Lapland. The wild ducks and geese, and the silvery swans, forming long triangles in the air, advance to the islands bordering on the very pole. The stork, formerly adored in Egypt, which she abandons, crosses over Europe, halting here and there, even in cities, on the roofs of hospitable Germany. All these birds feed their young with the insects fostered into life by the newly expanded herbage. The fishes too then leave in legions the northern abysses of the ocean, allured to the mouths of the rivers by clouds of insects, which are hurried along in their waters, or are hatched on their shores. They stem their currents in shoals, and advance bounding to their very sources. Others, as the North-capers,* suffer themselves to be carried along by the general current of the Atlantic Ocean, and appear like the hulls of ships on the coasts of Brasil and of Guinea. Quadrupeds themselves then undertake long peregrinations. Some proceed from south to north with the sun; others from east to west. Some traverse the rugged chains of mountains; others follow the courses of rivers that have never been navigated; lengthened columns of black cattle

* The North-caper is a species of the Whale. T.

pasture in America along the banks of the Mechasebe, which re-echo with their bellowings. Numerous squadrons of horses cross the rivers and the deserts of Tartary, and wild sheep wander bleating amid those boundless solitudes. These flocks have neither overseer nor shepherd to guide them in the deserts by the sound of his pipe, but the expansion of the herbage, which they know, fixes the moment of their departure, and the limits of their journey. Each animal then inhabits its native situation, and reposes beneath the shade of the vegetable of its ancestors. It is then that the chains of harmony are bound more tightly, and that all being animated by consonances or by contrasts, the air, the waters, the forests, and the rocks seem to be vocal, to be impassioned, and to murmur forth their delight.

But celestial intelligences alone are capable of embracing this vast concert. Man, if he would study Nature with advantage, must confine his researches to a single vegetable. For this purpose he must make choice of an aged tree in some retired spot. He might easily form a judgment whether it be in its natural situation from the characters I have indicated, and still better from its beauty and from the accessories which Nature never fails to associate with it, when the hand of man has not deranged her operations. He would first observe its elementary relations, and the striking characters which distinguish the species of the same genus, some of which grow at the sources of rivers, and others at their mouths. He would next examine its convolvuluses, its mosses, its misletoes, its scolopendras, the fungi at its roots, and even the grasses that grow under its shade. In each of its vegetables he would perceive new elementary relations, adapted to the places which they occupy, and to the tree that supports or shelters them. He should then direct his attention to all the species of animals which make it a habitation, and he would be convinced that there is not a single one which has not decided and characteristic relations to the depen

dencies of its vegetation. If this tree were growing in the midst of a forest, itself of considerable antiquity, it would probably have in its vicinity the tree which Nature has formed to contrast with it in the same situation, as, for example, the birch with the fir. It is farther probable that the accessory vegetables and animals of the last would, in like manner, form a contrast with those of the first. These two spheres of observations would mutually elucidate each other, and would diffuse the clearest light over the manners of the animals which frequent them. We should then possess an entire chapter of that immense and sublime history of Nature, with the alphabet of which we are still unacquainted.

I am convinced that, without fatigue, and almost without trouble, we should make the most curious discoveries; were we to confine our studies to one at a time, we should find a multitude of the most enchanting harmonies connected with it. To enjoy some imperfect sketches of this kind, we must have recourse to travellers. Our Ornithologists, fettered by their methods, are anxious only to swell their catalogue, and take notice, in birds, of nothing but the claws and the beak. It is not in their nests that they observe them, but in sporting and in their pouch. They even consider the colors of birds as merely accidental. It is not, however, by chance, that, on the shores of Brasil, Nature has painted with a beautiful carnation red, and that she has tipped with black the extremities of the wings of the ouara, a species of curlew, which inhabits the dark-green foliage of the *paletuvier*, that grows in the bosom of the waves, and bears no apparent flowers. The savia, another bird of the same climate, is yellow on the belly, while the rest of its plumage is grey. It is about the size of a sparrow, and perches on the pepper-plant, whose flowers have no brilliancy, but whose seeds it swallows, and sows in every direction. To these consonances must be added those of situation, which itself derives so much beauty from the vegetable by which it is overshadowed

These harmonies are described by Father Francois d'Abbeville. According to the History of Voyages, by the Abbe Prevost, the banks of the Senegal produce a fluviatic tree, with prickly leaves, and branches pendent in the form of arcades. It is inhabited by birds called Kurbalos, or fishers, of the size of a sparrow, and with variegated plumage. Their bill is very long, and armed with small teeth, like a saw. They build nests of about the bulk of a pear. They construct them of earth, straw, and moss, and suspend them by a long thread from the extremities of the branches that overhang the river, in order to secure themselves from the serpents and the monkies, which sometimes find means to climb up after them. There is nobody who would not take these nests, at a little distance, for the fruit of the tree: some of those trees contain upwards of a thousand. The kurbalos are seen fluttering incessantly over the water, and returning to their nests with a motion that dazzles the eyes. According to Father Charlevoix, there grows in Virginia, on the shores of the lakes, a laurel-leafed smilax, whose root shoots up several stems, the branches of which embrace all the surounding trees, and rise to the height of more than sixteen feet. In summer they form an impenetrable shade, and in winter afford to the birds a temperate retreat. Its flowers are far from brilliant, and its fruit grows in round clusters, filled with black seed. The principal inhabitant of this smilax is a very beautiful species of jay. The head of this bird is decorated with a long black crest, which he erects at pleasure. His back is of a dark purple color. His wings are black on the inside, blue externally, and white at the tips, with black stripes across each feather. His tail is blue, and striped in the same manner as his wings; and his cry is not disagreeable. There are birds which never lodge upon their favorite plant, but opposite to it. Such is the colibri, which, in the West India Islands, frequently nestles on a straw belonging to the thatch of a cottage, in order to live under the protection of man. In

our climates, the nightingale constructs his nest under cover of a bush, selecting in preference such situations where there are echoes, and taking care to expose it to the morning sun. Having employed these precautions, he takes his station in the vicinity against the trunk of a tree, and there, confounded with the color of its bark and motionless, he becomes invisible. But he soon animates with his divine melody the obscure retreat which he has chosen, and by his enchanting strains effaces all the brilliancy of plumage.

But whatever charms may be diffused by animals and by plants over the situations which have been assigned them by Nature, I can never think that a landscape possesses all its beauty unless I perceive in it at least one little hut. The habitation of man gives to every species of vegetable a new degree of interest or of majesty. Nothing more than a tree is, in many instances, necessary to characterize in a country the wants of its inhabitants, and the bounty of Providence. I love to see the family of an Arab beneath the date-tree of the desert, and the boat of the native of the Maldivia Islands, loaded with cocoa-nuts, under the cocoa-trees of their sandy beach. The hovel of poor negro, destitute of ingenuity, pleases me under the hade of a calebash-tree, which produces all his domestic utensils. Our magnificent hotels dwindle in the city into paltry houses; in the country they are castles, palaces, temples. The long avenues which announce them, are confounded with those that form the communication of empires. This, however, is not what I consider as the most interesting in our rural scenery, and have often preferred to it the view of a fisherman's hut, built on the bank of a river. With delight I have sometimes reposed under the shade of willows and of poplars, on which were suspended bow-nets made of their own branches.

We shall now proceed to take, as usual, a rapid glance of the harmonies of plants to man; and for the purpose of introducing at least something of order into a subject so

rich, we shall farther divide these harmonies, relatively to man himself, into elementary, into vegetable, into animal, and into human, properly so called, or alimentary.

HUMAN HARMONIES OF PLANTS.

OF THE ELEMENTARY HARMONIES OF PLANTS WITH RELATION TO MAN.

If we consider the vegetable order under the simple relations of strength and magnitude, we shall find it divided generally into three great classes, into herbs, into shrubs, and into trees. We shall first remark that herbs are of a substance pliant and tender. If they were hard and ligneous, like the young branches of trees, to which it might appear that they ought naturally to have a resemblance, since they grow on the same soil, the greatest part of the earth would have been inaccessible to the foot of man, till the hatchet or fire had cleared the way. It is not, therefore, by accident that so many grasses, mosses, and herbs are of a soft and yielding texture, nor from want of nourishment, or of the means of expansion; for some of these herbs rise to a great height, such as the banana of India, and several ferulaceous plants of our climates, which attain the elevation of a little tree.

On the other hand there are ligneous shrubs, which do not exceed herbs in size, but they grow, in general, in rugged and steep places, and afford to man the facility of climbing up them, by shooting even into the very clefts of the rocks. But as there are rocks which have no clefts, and which are perpendicular as walls, there are likewise creeping plants, which, taking root at their bases, adhere to their sides, and rise with them to a height exceeding that of the most lofty trees: such are the ivy, the virgin-vine, and a great number of the lianes which clothe the rocks of southern regions. If the earth were covered with this kind, it would be impossible to walk upon its surface.

It is very remarkable that, on the discovery of uninhabited islands, some were found covered with forests, as the Island of Madeira; others in which there was nothing but herbage and rushes, as the Malouin Islands, at the entrance of the Streight of Magellan; others merely clothed with mosses, as several islets situated on the coast of Spitzbergen; others, in great number, in which these different vegetables were blended together: but I know not of a single one which was found to contain only bushes and lianes. Nature has placed those classes only in places difficult to be scaled, in order to facilitate the access to man. It may even be asserted that no precipice is so steep but what may be surmounted with their assistance. By their aid the ancient Gauls were on the point of scaling the Capitol.

As to trees, though they are replenished with a vegetative force which raises them to a great height, yet most of them do not send out their first branches but at a certain distance from the ground: so that, though they form, at a certain elevation, an intertexture impenetrable to the sun, extending to a considerable distance around them, they however leave about their base avenues sufficient to render them accessible, and to enable man to traverse the forest with ease in every direction.

Such then are the general dispositions of vegetables on the earth, with relation to the necessity which man has to range over it; the herbage serves as a carpet to his feet; the shrubbery as a ladder to his hands; and the trees as parasols over his head. Nature, having established these proportions among them, distributed them over every variety of situation, conferring upon them, abstractedly from their individual relations to the elements and to animals, the qualities best adapted to supply the wants of man, and to compensate in his favor the inconveniencies of climate. Though this manner of studying her works is now held in contempt by most naturalists, yet it is to this that we shall confine ourselves. We have just been con-

sidering plants according to their size like gardeners; we shall now proceed to examine them after the manner of the wood-cutter, the huntsman, the carpenter, the fisherman, the shepherd. the mariner, and even the nosegay girl. It is of little importance whether we appear learned, provided we cease not to be men.

In the regions of the north, and on the summit of cold mountains, grow the pine, the fir, the cedar, and most of the resinous trees, which shelter man from the snows by the thickness of their foliage, and furnish him, during winter with torches and fuel. It is very remarkable that the leaves of these evergreens are filiform, and exceedingly well adapted, from this configuration, which possesses the farther advantage of reverberating heat like the hair of animals, to resist the violence of the winds, which commonly prevail in elevated situations. The naturalists of Sweden have observed that the most productive pines are found in the dryest and most sandy regions of Norway. The larch, which likewise delights in cold mountains, has a very resinous trunk. Mathiola, in his useful commentary on Dioscorides, says, that no substance whatever is more proper than the charcoal from these trees for speedily melting iron ores, in the vicinity of which they are fond of growing. They are, besides, covered with mosses, some species of which catch fire at the slightest spark. He relates that being obliged to pass one night on the lofty mountains near the pass of Trent, where he was botanizing, he there found a great number of larches, bearded all over, as he says, and quite white with moss. The shepherds of the place, with a view to afford him some amusement, set fire to the mosses of some of the trees, which burst into a flame with the rapidity of gunpowder. The flames and the sparks seemed, amid the darkness of night, to ascend to the very sky. They diffused, while burning, a very agreeable smell. He farther remarks that the best agaric grows upon the larch, and that the soldiers, who, in his time, were armed with match-locks, employed it for keep-

ing up a fire, and making matches. Thus Nature, in crowning the summits of cold and ferruginous mountains with these prodigious vegetable torches, has placed the match in their branches, the tinder at their foot, and the steel at their roots.

On the south, on the contrary, trees present in their foliage fans, umbrellas, and parasols. The latanier has each of its leaves folded like a fan, attached to a long stalk, and resembling, when completely expanded, a radiating sun of verdure. Two of these trees may be seen in the Garden of Plants, at Paris. The leaf of the banana resembles a long and broad girdle, which undoubtedly procured it the name of Adam's fig-tree. The magnitude of the leaves of several species of trees increases in proportion as we approach the line. That of the double cocoa-nut-tree of the Sechelles Islands is from twelve to fifteen feet in length, and seven or eight in breadth. It is sufficient to cover a numerous family. One of these leaves is to be seen in the Museum of Natural History. That of the talipot of the Island of Ceylon is nearly of the same size. The interesting and unfortunate Robert Knox, who has given the best account of that island with which I am acquainted, says, that one of these leaves is capable of covering fifteen or twenty persons. When it is dry, he adds, it is both strong and pliant, so that you may fold and expand it at pleasure, being naturally plaited like a fan. In this state it is not larger than a man's arm, and extremely light. The natives cut it into triangles, though it is naturally round, and each of them carries a piece on his head, holding in his hand the pointed end before, to open a passage through the bushes. With this leaf the soldiers construct their tents. They consider it, and with justice, as one of the greatest blessings of Providence, in a country parched by the sun, and inundated by rains during one half of the year. Nature has, in those climates, provided parasols for whole villages; for the fig-tree, denominated in India the fig-tree of the Banians, and of which a draw-

ing may be seen in Tavernier and other travellers, grows on the burning sand itself of the sea-shore, throwing out from the extremities of its branches a multitude of shoots, which incline towards the ground, take root in it, and form around the principal trunk a multitude of arcades, covered with foliage impervious to the sun.

In our temperate climates we experience a similar benevolence on the part of Nature. It is in the hot and dry season that she bestows on us a variety of fruits, replenished with refreshing juices, such as the cherry, the peach, the melon; and at the approach of winter such as warm us by their oils, as the almond and the walnut. Some naturalists have considered the ligneous shells of those fruits as the means of preserving their seed against the rigors of the inclement season; but these, as we have already seen, are the means of navigation. Nature employs others with which we are not acquainted, to preserve the substances of fruits from the impressions of the air. She preserves, for example, through the whole winter, several species of apples and pears, which have no other covering than a pellicle so delicate that it is impossible to determine its thickness.

Nature has placed in humid and parched situations other vegetables, the qualities of which are inexplicable by the laws of our physics, but which admirably correspond with the necessities of the inhabitants of those places. By the side of waters grow the plants and the trees which are the dryest, the lightest, and consequently the most proper for crossing them. Such are the reeds which are hollow, and the rushes filled with inflammable pith. It requires but a moderate bundle of rushes to support a very heavy man upon the water. On the banks of the lakes of the north grow those prodigious birch-trees, the bark of one of which is sufficient to make a large canoe. This bark resembles leather in suppleness, and is so incorruptible by humidity, that, in Russia, I have seen some of it extracted from under the earth with which powder magazines were covered,

though it had lain there ever since the time of Peter the Great. According to the testimony of Pliny and Plutarch, four hundred years after the death of Numa, the books which that great king had directed to be deposited with his body in the tomb, were found at Rome. The body was totally consumed; but his books, which treated of philosophy and of religion, were in such preservation, that Petilius, the prætor, read them by the command of the senate. On the report which he made concerning them, it was decreed that they should be burned. They were written on the bark of birch. This bark separates into ten or twelve leaves, white and thin like paper, and supplied the place of that material to the ancients. Nature presents to man other means of passage on other shores. On the banks of the rivers of India she has placed the bamboo, an enormous reed, which there sometimes attains to the height of sixty feet, and to the thickness of a man's thigh. The space comprehended between two of its joints, is sufficient to support a man upon the water. The Indian seats himself astride upon it, and thus crosses rivers, paddling along with his feet. The Dutch navigator, John Hugo de Linschoten, an author deserving of credit, assures us that the crocodiles never touch persons who are crossing rivers in this manner, though they frequently attack canoes, and even the boats of Europeans. He ascribes this abstinence on the part of that voracious animal to an antipathy which he has to that species of reed. François Pyrard, another traveller, who has observed Nature with attention, says, that on the shores of the Maldivia Islands, grows a tree called candou, the wood of which is so light, as to serve the fishermen for cork. I think I once had in my possession a piece of a tree of the same species. It was stripped of the bark, perfectly white, as thick as my arm, about six feet long, and so light that I could lift it by my finger and thumb with the greatest ease. In the same islands, and on the same sands rises the cocoa-tree, which there thrives in greater beauty than in any other

part of the world. Thus the tree, the most useful to mariners, grows on the shores of those seas that are the most navigated. Every one knows that a vessel is there constructed with its wood, that its leaves are formed into sails, its trunk into a mast, that the tow which surrounds its fruit is wrought into cordage, and that it is afterwards freighted with a cargo of its own cocoa-nuts. It is farther remarkable that the cocoa-nut, before it arrives at perfect maturity, contains a liquor which is an excellent antiscorbutic. Is it not then a miracle of Nature that this fruit, replenished with milk, should grow on barren sands, and on the borders of the briny deep? Nay, it is only on the sea-shore that the tree which bears it attains its greatest beauty; for few of them are to be found in the interior of any country. Nature has placed a palm-tree of the same family, but of another species, on the summit of the mountains of the same climates, I mean the cabbage palm. The stem of this tree is sometimes more than one hundred feet in height, and bears on its top all its foliage, which consists of a bunch of palm-branches, from the midst of which issues a long roll of folded leaves, resembling the shaft of a lance. This roll contains, in a kind of coriaceous sheath, the young leaves, which are excellent eating before their expansion. The trunk of the cabbage-palm has no wood, excepting at the circumference; but it is so hard as to turn the edge of the best hatchet. It may be split from one end to the other with the greatest facility, and the inside is filled with a spongy substance, which may easily be taken out. Thus prepared, it serves for pipes, incorruptible by humidity, to conduct the waters, frequently diverted by the rocks which are at the summit of the mountains. Thus the palm-trees furnish the inhabitants of those regions with materials for aqueducts at the sources of the rivers, and for building ships at the place of their discharge. Other species of trees render the same services in other situations. On the shores of the Antilles grows the mahogany, there improperly called cedar, on account

of its incorruptibility. It grows to such a bulk, that with the trunk of a single tree they make a boat capable of carrying forty persons. This tree possesses another quality, which, in the judgment of the best observers, might render it invaluable for ship-building; it is the only one on those shores which the sea-worm never attacks, though that insect is so destructive to every other species of wood that floats in those seas, as to devour whole squadrons in a very short time; so that to preserve ships from its ravages, we have been obliged, within these few years, to sheath their bottoms with copper. But this beautiful tree has found enemies more fatal than the worms, in the European inhabitants of those islands, who have almost exterminated the species.

The manner in which Providence has contrived a supply for the thirst of man in dry situations is equally worthy of admiration. Amid the scorching sands of Africa, Nature has placed a plant, whose leaf, twisted into the form of a cruet, is always filled with a large glassful of fresh water: the neck of this cruet is stopped by the end of the leaf itself, so that the water cannot evaporate. She has planted on some parched districts of the same country a great tree called by the negroes Boa, the trunk of which, of prodigious bulk, is naturally hollowed out like a cistern. In the rainy season it is replenished with water, which it keeps cool during the most intense heat, by means of the tufted foliage which crowns its summit. Finally, she has placed vegetable fountains on the arid rocks of the Antilles. You commonly find on them a liane, called the water liane, so full of sap, that if you cut a single branch, as much water is immediately discharged as a man can drink at a draught: it is perfectly pure and limpid. In the lagoons of the Bay of Campeachy, travellers find relief in a different manner: these lagoons, on a level with the sea, are almost entirely inundated in the rainy season, and are so parched in the dry season, that hunters who have accidentally lost their way in the forests by which

they are covered, have actually perished of thirst. The celebrated navigator Dampier relates, that he several times escaped that calamity by means of a very extraordinary species of vegetation, which had been pointed out to him on a kind of pine, very common in those parts. It resembles a parcel of leaves placed one over the other in stages; and on account of its form and the tree upon which it grows, he calls it the pine-apple. This apple is full of water; so that on piercing the lower part of it with a knife, a good pint of very clear and wholesome water immediately flows from it. Father du Tertre relates that he often found the same kind of refreshment in the horn-shaped leaves of a species of *balisier*, which grows on the sandy shores of Guadaloupe. I have heard many of our sportsmen remark that nothing is more proper for quenching thirst than the leaves of the misletoe, which grows on our trees.

Such are, in part, the precautions employed by Providence, to compensate in favor of man the inconveniences of every climate, by opposing to the qualities of the elements contrary qualities in vegetables. I shall pursue them no farther, for the subject is, in my opinion, inexhaustible. I am persuaded that every latitude and every season has some peculiarity appropriated to itself, and that every parallel varies them in every degree of longitude.

VEGETABLE HARMONIES OF PLANTS WITH MAN.

If we now consider the vegetable relations of plants to man, we shall find them to be infinite in number; they are the perpetual sources of our arts, of our manufactures, of our commerce, and of our enjoyments; but in our usual way, we shall only consider some of their natural and direct relations, among which man has introduced nothing of his own.

To begin then with their perfumes, man appears to me to be the only sensible being that is affected by them. Animals, indeed, and in particular the bees and butterflies,

have plants which are peculiar to them, and which attract or repel them by their emanations; but these affections seem to be connected with their necessities. Man alone is sensible to the perfume and the brilliant color of flowers, independent of all animal appetite. Even the dog, who receives from domestication such a powerful tincture of human habits and manners, appears insensible to this enjoyment. The impression made upon us by flowers seems to be connected with a certain moral affection; for there are some that enliven us, whereas others render us melancholy, without our being able to assign any other reasons for it, than those which I have endeavoured to establish in the examination of some of the general laws of Nature. Instead of distinguishing them into yellow, into blue, and into violet, we might divide them into gay, into grave, and into melancholy. Their character is so expressive, that lovers in the east employ their hues to describe the different degrees of their passion. Nature makes frequent use of them relatively to us, with the same intention. When she designs to keep us at a distance from a marshy and unhealthy place, she there places poisonous plants which have disagreeable colors and disgusting smells. There is a species of arum which grows among the marshes of the Streight of Magellan, whose flower exhales such a strong stench of putrid flesh, that the flesh-fly resorts to it for the purpose of depositing her eggs. But the number of fetid plants is not very great. The fields are clothed with flowers, most of which have very pleasing colors and agreeable perfumes. I wish that time would permit me to say something of the simple aggregation of flowers; this subject is so vast and so rich, that I have no hesitation to affirm that it affords ample employment to the most eminent botanist of Europe during his whole life, by discovering to him every day something new, and without calling him more than a league from his own habitation. All the art with which jewellers arrange their gems is nothing in comparison to that which Nature displays in

the assortment of flowers. I shewed J. J. Rousseau the flowers of different trefoils which I had collected while walking with him: some were disposed in crowns, in half-crowns, in ears, in sheaves, with colors varied without end. When they were on their stems, they had other aggregations with plants frequently opposite to them in colors and in forms. I asked him if botanists paid attention to those harmonies. He replied, no; but that he had advised a young designer of Lyons to learn botany, for the purpose of studying the forms and the assemblages of flowers, and that he had, in consequence, become one of the most celebrated pattern-drawers in Europe. On this subject I quoted a passage in Pliny, with which he was highly pleased: it relates to a painter of Sicyone, named Pausias, who learned, by means of this study, to paint flowers at least as well as the artist of Lyons knew how to draw them. He had, it is true, another master not less skilful than Nature herself, or rather one and the same with her, namely—Love. I shall give this story in the simple language of the old translator of Pliny, in order to preserve all its natural vivacity. "In his youth," says he, "Pausias was enamoured of a nosegay-girl of his town, named Glycera, who was very pretty, and had ten thousand ways of assorting the flowers of nosegays and of chaplets; so that Pausias, copying after Nature, the nosegays and the chaplets of his mistress, at length rendered himself perfect in that art. Finally, he painted her seated, and making a chaplet of flowers, and this picture is considered as one of his master-pieces. He called it *Stephano-Plocos*, because Glycera had no other means of alleviating the pressure of poverty than by the sale of nosegays and chaplets. And it is moreover asserted that L. Lucullus gave Dionysius, of Athens, two talents for a mere copy of this picture." This anecdote must have afforded particular pleasure to Pliny, for he has repeated it in another place. "The inhabitants of Peloponnesus," says he, were the first who adapted to each other the colors and smells of the

flowers of which chaplets were composed. It was, however, originally the invention of Pausias, a painter, and of a flower-girl, named Glycera, with whom he was deeply in love, so as even to imitate to the life the chaplets and nosegays which she made. But the girl varied in so many ways the arrangement of her chaplets, for the purpose of exercising the ingenuity of her lover, that nothing could be more amusing than to view the contest between the natural work of Glycera, and the skill of Pausias, the artist."

Ancient Nature is much better acquainted with this subject than the young Glycera. As it is impossible for us to follow her in her infinite variety, we shall make at least one observation on her regularity. It is this, that there is not one single odoriferous flower but what grows at the feet of man, or at least within the reach of his hand. All those of this description are placed on herbage, or on shrubs, as the heliotrope, the carnation, the gilly-flower, the violet, the rose, the lilach. Nothing like these grows on the lofty trees of our forests; and if some brilliant flowers are to be found on certain tall trees of foreign countries, such as the tulip-tree and the Indian chesnut, they have no very pleasant smell. The flowers of the cinnamon-tree smell like human excrement; this I know by experience, if the trees which were shewn me in the Isle of France, at the residence of M. Magon, were the real cinnamon. The beautiful and fragrant flower of the magnolia grows on the lower part of the tree. Besides, the laurel which bears it, is, like the spice-trees, of no great elevation.

It is possible that I may be mistaken in some of my observations: but when they are multiplied with respect to the same object, and attested by persons worthy of credit and uninfluenced by the spirit of system, I am able to deduce from them general consequences, which cannot be indifferent to the happiness of mankind, as they manifest the invariable intentions of benevolence in the author of

Nature. Their various adaptations reflect light on each other; the means are different, but the end is constantly the same. That goodness which placed the fruit, designed for the nourishment of man, within the reach of his hand, must likewise have placed his nosegay in a similar situation. We shall here remark, that our fruit-trees are easy to climb, and differ in this respect from most of the forest trees. Farther, all those that produce fruits which are soft when ripe, and would be liable to be bruised in falling, as the fig, the mulberry, the peach, the apricot, present them at a small distance from the ground: those, on the contrary, that yield hard fruits, which run no risk of sustaining injury by a fall, carry them at a great elevation, as the walnut, the chesnut, and the cocoa.

Adaptations equally extraordinary are to be found in the forms and sizes of fruits. Some are moulded for the mouth of man, as the cherry and the plumb; others for his hand, as the apple and the pear; others, much larger, as melons, are divided into slices, and seem intended to be eaten in the social family circle; nay, there are even some in India, as the jack, and, among ourselves, the pumpion, which are large enough to be divided among a whole neighbourhood. Nature seems to have observed the same proportions in the different sizes of fruits designed for the nourishment of man, as in the magnitude of the leaves which are intended to afford him shade in hot countries; for she has there contrived them in such a manner as to shelter a single individual, a whole family, or all the inhabitants of the hamlet.

I shall not enlarge on the other relations which plants have to the habitation of man, in their size and their attitude, though some very curious observations might be made on that subject. There are few which are not capable of adding some embellishment to his field, his roof, or his wall. I shall merely remark that the neighbourhood of man is beneficial to many plants. An anonymous missionary relates that the Indians are persuaded that cocoa trees, at the

foot of which houses have been erected, are much more flourishing than those that have none, as if these useful trees took delight in being near the habitation of man.

Another missionary, a barefooted Carmelite, called Father Philip, positively asserts that when the cocoa-tree is planted near houses or huts, it is rendered more fruitful by the smoke, the ashes, and its proximity to the dwelling of man, and that it produces double the quantity of fruit; that it is for this reason the grounds which are planted in India with palm-trees, are crowded with houses and cabins; that the proprietors of those plantations give at first a sum of money to any who chuse to reside in them, and are obliged to allot them a portion of the fruits when they are gathered. He farther adds, that though their fruits, which are very large and hard, frequently fall from the trees when ripe, either from being knawed by the rats, or from the violence of the winds, there is not a single instance of any of the inhabitants underneath having ever been hurt by them. This appears to me no less extraordinary than it did to him.

I might extend the influences of man to many of our fruit-trees, especially to the apple-tree and the vine. I never saw finer apple-trees in the Pays de Caux, than those which grow around the habitations of the peasantry. The attention of the owner may, it is true, contribute to their flourishing state. I have often stood still in the streets of Paris to contemplate with pleasure some small vines, the roots of which are in the gravel under the pavement, covering with their clusters the whole front of a guard-house. One of them, I believe, about seventeen or eighteen years ago, produced fruit twice in one year, as was related in the public prints.

ANIMAL HARMONIES OF PLANTS WITH MAN.

Nature would not have been satisfied with giving to man bowers and carpets, covered with fruit, had she not likewise furnished him in the vegetable order itself with means

of defence against the depredations of wild beasts. In vain would he have watched during the day to protect his property, which would have been exposed to pillage during the night. She has bestowed on him prickly shrubs for the purpose of enclosing it; and the farther we proceed southward, the greater variety we find in their species. But, on the contrary, we see none, or at least very few of these prickly shrubs in the north, where they appear useless, for in those countries there are no orchards. In the Indies there seem to be species adapted to every possible situation. Though I have only been on the skirts, as I may say, of those regions, I there enjoyed an opportunity of seeing a great number, the study of which would suggest very curious remarks to a naturalist. I observed one among the rest in a garden in the Isle of France, which to me appeared proper for making fences impenetrable to the smallest quadruped. It grows in the form of a stake, as thick as a man's arm, perfectly straight, without branches, and bearing no verdure but a small tuft of foliage on its summit. It rises to the height of seven or eight feet, and is as thick above as below. A row of these shrubs, planted close to each other, would form a real palisade, without the smallest interval. The Indian fig and the taper, so common in the torrid zone, have thorns so sharp as to pierce the soles of your shoes if you walk over them. Neither tigers, nor lions, nor elephants dare to approach them. There is another species of thorn in the Island of Ceylon, which is employed as a fence against man, accustomed as he is to conquer every obstacle. Robert Knox, whom I have already quoted, says that the avenues to the kingdom of Candy, in the Island of Ceylon, are barricaded only with faggots of these thorns, with which the inhabitants obstruct the passes of their mountains.

Man finds in vegetables a protection not only against ferocious beasts, but likewise against reptiles and insects. Father du Tertre relates that, in the Island of Guadaloupe, he one day found at the foot of a tree a creeping plant,

the stalks of which resembled serpents. But he was still more surprized when he perceived seven or eight snakes lying dead around it. He mentioned the circumstance to a medical man, who performed many wonderful cures by employing this plant as an antidote to the bite of those dangerous reptiles. It is very common in the rest of the Antilles, where it is known by the name of snake-wood. It is likewise found in the East Indies. John Hugo de Linschoten ascribes to it the same figure and the same qualities. In our own climates we have vegetables which present very extraordinary consonances and contrasts with reptiles. Pliny says, that serpents are very fond of the juniper and of the fennel; but that they are never found under the fern, the trefoil, the ash-tree, or the rue, and that betony kills them. Other plants, as we have before observed, destroy the flies, such as the dionæa. Thevenot assures us that in India, grooms defend their horses from the flies by rubbing them every morning with the flowers of the gourd. Flea-bane, which produces black, shining seed, resembling fleas, clears the house of those insects, according to Dioscorides. The echium, whose seed is shaped like the head of the viper, is fatal to those reptiles. It was probably from such configurations as these, that the first inhabitants of the earth were instructed in the relations and oppositions that exist between plants and animals. It is my opinion that every genus of insect has its destructive vegetable, with which we are not acquainted. In general all vermin shun perfumes.

Nature likewise gave mankind in plants the first patterns of nets for hunting and fishing. On some of the heaths of China grows a species of rotin, so thickly interwoven and so strong as to catch stags alive. I have myself seen on the sandy shore of the Isle of France, a species of liane called the false potatoe, which covers whole acres like a vast fishing-net. It is indeed so admirably adapted to that purpose, that the negroes actually employ it in catching fish With its stalks and leaves they form long cords,

which they throw into the sea, and having composed a chain encompassing a great space of water, they draw it by the two ends to the shore. They seldom fail to bring some fish out with it; for the fishes are terrified not only by a net which incloses them, but by every unknown body which throws a shadow upon the water. With a contrivance equally simple, and nearly resembling the former, the inhabitants of the Maldives take prodigious quantities of fish; to drive them into their reservoirs they employ nothing but a cord, which floats on the water by means of sticks.

HUMAN OR ALIMENTARY HARMONIES OF PLANTS.

There is not a single plant on the face of the earth, but what has some relations to the wants of man, and serves in one part or other for his clothing, his habitation, his pleasures, his medicine, or at least for fuel. Some which we consider as entirely useless, are held in other regions in the highest estimation. The Egyptians have often put up prayers for a plentiful crop of nettles, whose seeds supply them with oil, and whose stalks furnish them with thread, which they weave into excellent cloth. But these general relations being innumerable, I shall confine myself to some particular observations on the plants, which minister to the most pressing of human necessities, I mean to the food of man.

We shall first remark that corn, which serves for the general subsistence of the human race, is not produced by vegetables of great size, but by mere grasses. The principal support of human life is borne by herbage, and is liable to be affected by the slightest breath of wind. It is probable that if the security of our crops had been left to our own contrivance, we should not have failed to place them on large trees; but in this instance, as in every other, we cannot but admire the divine Providence, and mistrust our own wisdom. If our harvests were the produce of

forests, when these are destroyed by war, or burned by our imprudence, or levelled by winds, or swept away by inundations, it would require whole ages to re-produce them in a country. Besides, the fruits of trees are much more liable to blight than the seeds of grasses. The grasses, as we have before observed, bear their flowers in an ear, frequently surmounted by little beards, not, as Cicero says, to protect their seeds against the birds, but to serve as so many little roofs to shelter them from the waters of heaven. The drops of rain cannot drown them, as they do flowers radiated in disks, in roses, in umbels, forms undoubtedly adapted to certain seasons and certain situations, while those of grasses are suited to every exposure.

When they are borne by flowing and drooping plumes, like those of most grasses of hot countries, they are sheltered from the heat of the sun, and when they are collected into an ear, like those of most of the grasses of cold climates, they reflect his rafis, at least on one side. Besides, by means of the suppleness of their stems, strengthened at intervals by joints, and by their filiform and capillaceous leaves, they are secured from the violence of the winds. Their weakness is more useful to them than strength to the most stately trees. Like small fortunes, they are re-sown and multiplied by the same tempests which lay waste whole forests. They likewise resist drought by the length of their roots, which proceed in quest of moisture to a great distance underground; and though their leaves are narrow, they are so numerous as to cover with their multiplied shadows the surface of the earth. At the slightest shower, you observe them all rising erect in the air at their extremities, like so many claws. They even resist conflagration, by which so many trees of the forest are destroyed. I have seen countries where the herbage is every year set on fire in the dry season, and which, as soon as it rains, are again covered covered with the freshest verdure. Though this fire is so active as frequently to kill the trees that are near the spot,

yet the roots of the herbs receive no injury. They moreover possess the faculty of propagating themselves in three different ways; by shoots which spring up from their feet, by creeping branches which they throw out to a considerable distance, and by seeds extremely volatile or indigestible, which the winds and the animals scatter on every side. On the contrary, the greatest part of trees are naturally re-produced only by seed. To these general advantages of grasses must be added the astonishing variety of characters in their florification and in their attitudes, which renders them more proper than vegetables of any other class to grow in every kind of situation.

It is in this cosmopolitan family, if I may so express myself, that Nature has placed the principal aliment of man: for the different kinds of corn on which so many nations subsist, are nothing more than species of grasses. There is not a spot on the face of the globe which is not capable of producing some species of corn. Homer, who had studied Nature with such attention, frequently characterizes a country by the vegetable peculiar to it. He celebrates one island for its grapes, another for its olives, a third for its laurels, and a fourth for its palm-trees; but he bestows on the Earth alone the general epithet of *Zeidora*, corn-giving. Nature has, in fact, formed it for growing in every situation, from the Line to the coasts of the Frozen Ocean. Some species are adapted to the humid districts of hot countries, as the rice of Asia, which yields an abundant produce in the mud of the Ganges: others are suited to the marshy grounds of cold regions, as a species of oats which grows spontaneously on the banks of the rivers of North America, and of which various savage nations annually reap abundant harvests. Other kinds of corn thrive wonderfully in hot and dry soils, as the millet and the pannic, in Africa, and the maize in Brasil. In our climates wheat thrives best in a strong soil, rye in sands, buck-wheat on rainy hills, oats in humid plains, barley among rocks. Barley grows in

the very heart of the north. In the sixty-first degree of north latitude, among the rocks of Finland, I have seen crops as flourishing as were ever produced in the plains of Palestine. Corn affords a supply to all the necessities of man. Its straw furnishes him with the means of lodging, of covering, of warming himself, of feeding his sheep, his cow, and his horse: with its grain he composes aliments and liquids of every possible flavour. The northern nations brew it into beer, and distil from it spirits more potent than those of wine; such are those of Dantzig. The Chinese extract from rice a kind of wine as agreeable as the best wines of Spain. With maize the natives of Brazil prepare their *ouicou*. Finally, with parched oats it is possible to make a cream, which shall have the perfume of vanilla. If we add to these qualities those of other domestic plants, most of which likewise grow all over the earth, we shall find in them the taste of the clove, of pepper, and other spices; and without going farther than our own gardens we shall collect the delicacies distributed among the other classes of vegetables.

We may discover in barley and in oats the elementary characters which I have already described, and which vary the species of plant of the same genus according to the situations in which they are designed to grow. The barley, destined for dry soils, has leaves broad and open at their base, which conduct the rain-water to its roots. The long beards which surmount the cases that envelop its grain, are covered with indentions adapted to the purpose of adhesion to the hair of animals, and of re-sowing them in lofty and dry situations. Oats, on the contrary, being designed for humid soils, have narrow leaves, closely attached to the stem to intercept the rain. Their bulging cases, resembling two halves of a long bladder, and not adhering very closely to the grain, render them proper for floating, and for crossing waters with the aid of the winds. But here we are presented with something still more wonderful, which will confirm what we have advanced on the

uses of the different parts of plants with relation to the elements, and which extends the views of Nature even beyond their fruits, which we have considered as decisive of their characters: it is that barley, in rainy years, degenerates into oats, and that oats, in dry seasons, are converted into barley. This observation, recorded by Pliny, Galen and Mathiola, the commentator of Dioscorides, has been confirmed by the experiments of various modern naturalists. Mathiola indeed asserts that this transformation of barley is not into oats properly so called, which he terms *Bromos*, but into a plant resembling it at first sight, and to which he gives the name of Ægilops. This transformation, ascertained by the repeated experiments of the husbandmen of this country, and by that which Galen's father made expressly for his own satisfaction, together with that of the flowers of the linarium, and of the leaves of many vegetables, is sufficient to demonstrate that the elementary harmonies of plants are only secondary harmonies, and that the animal or human are the primary relations. Nature has, accordingly, placed the character of a plant not only in the form of the fruit, but likewise in its substance.

I hence presume that, having made in general the farinaceous substance the basis of human life, she has diffused it in the various species of grasses over every situation; that intending afterwards to add to them modifications relative to different humours of our temperament, or to certain influences of the season, or of the climate, she has formed with it other combinations which she has placed in leguminous plants, as pease and beans, which the Romans comprehend under the class of corn, and, lastly, that she has formed another kind which she has introduced into the fruits of trees, as chesnuts, or into the roots, as potatoes. These consonances of substance with every climate are so certain, that in every country the most common fruit is the most wholesome. I farther presume that she has followed the same plan with regard to medicinal plants, and that, having bestowed on different families of vegetables

virtues relative to the blood, the nerves, and the humours of man, she has modified them in every country according to the diseases engendered there by the climate, and has placed them in opposition to the particular characters of those diseases. It is, in my opinion, from having neglected these observations, that so many doubts and disputes have arisen concerning the virtues of plants. A simple, which cures a malady in one country, sometimes aggravates it in another. Quinquina, which is the bark of a species of fresh-water mangrove of Mexico, cures a particular kind of fever in America, incident to damp and hot situations, but frequently fails when employed against those of Europe. Every medicine is modified like every malady, according to the place. I shall not pursue this reflection any farther, as it would lead me from my subject; but if medical men would pay that attention to it which it deserves, they would study more carefully the plants of their own country, and would not prefer, as they generally do, those of foreign regions, which they are obliged to modify in a thousand different ways, in order to give them, at random, adaptations to local maladies. So much is certain, that when Nature has attached a certain taste to any vegetable, she repeats it over the whole surface of the earth, with modifications which, however, do not prevent our discovering its principal virtue. Accordingly, having planted the scurvy-grass, that powerful antiscorbutic even on the foggy shores of Spitsbergen, she has repeated its taste and qualities in the cress of our streams, in the cress of our gardens, in the nasturtium, which is a cress of the rivers of Peru, and, finally, in the very seed of the papaw, which grows in humid situations in the West India Islands. We find, in like manner, the taste, the smell, and the qualities of our garlic, in different species of the woods, the parks, and the mosses of America.*

* I shall here observe that garlic, the smell of which is so offensive to our fine ladies, is, perhaps, the most powerful remedy that exists for the vapors and the nervous complaints to which they are subject. I have had frequent opportunities of witnessing its efficacy Pliny even asserts that it is

From these considerations I am persuaded that the elementary characters of plants, and their entire configuration are only secondary means, and that their principal character depends on the necessities of man. To establish, therefore, a simple and agreeable order among plants, instead of

a cure for the epilepsy. It is likewise an antiseptic, and every plant which has that kind of smell, possesses the same virtues. It is not a little remarkable that the plants which have the smell of garlic, grow, in general, in marshy situations, as a remedy provided by Nature against the putrid emanations exhaling from them. Such, among others, is the scordium. Galen relates that its antiseptic virtues were discovered by this circumstance, that after a battle, the dead bodies which happened to lie on plants of the scordium were much less putrid than those in other situations, and that these bodies had remained fresh and sound on the side which had been in contact with the plants. But the experiments which the Baron Busbequius made with them on living bodies, is still more striking. That great man, returning from his first journey to Constantinople, a Turk, belonging to his suite, was attacked with the plague, and died. His companions divided his clothes, in spite of the representations of the Baron's physician, who predicted that it would not be long before the plague was communicated to them. In the course of a few days the symptoms of that dreadful malady actually made their appearance. But let us permit the learned and virtuous ambassador himself to state the consequences of that event. "The day after our departure from Adrianople," says he, "they all repaired to him, with a melancholy and dejected air, complaining of violent head-ache, and imploring relief. They were sensible that these were the first symptoms of the pestilence. At first my physician severely reprimanded them, and said he was surprised that they should apply for remedies against an evil of which he had forewarned them, and which they had so eagerly sought. It must not, however, be supposed that he was unwilling to make every exertion in his power to save their lives: on the contrary, he was extremely perplexed about the means of relieving them. How indeed were medicines to be procured on a road where frequently the most common necessaries are not to be had? Providence became our only hope, and we were succored effectually. I shall proceed to relate in what manner.

"On our arrival at any place during our journey, I was accustomed to walk about in the vicinity, in quest of any thing curious. That day I was so fortunate as to direct my course to the skirts of a meadow. I perceived in it a plant with which I was unacquainted; I smelled it, and it had the odor of garlic. I immediately gave it to my physician, asking if he knew what it was. After examining it with attention, he replied that it was the scordium. He raised his hands towards Heaven, and returned thanks to God for the remedy which he had so seasonably sent us. He immediately gathered a great quantity, which he put into a pot to be well boiled. He then desired his patients to take courage, and without losing a moment, he made them drink the decoction of the plant, into which he put a small quantity of earth of Lemnos. He then had them well warmed and sent to bed, directing them not to go to sleep till they had been in a profuse perspiration. With this injunction they strictly complied, and the next day found themselves greatly relieved. A second dose was administered, and this medicine compleated their cure. In this manner, by the blessing of God, we escaped death, which seemed to be very near at hand." *Letters of Baron Busbequius, Vol. I.*

going successively through their elementary, vegetable, animal, and human harmonies, we ought to reverse that order; but yet without altering it, and beginning with the plants which supply the primary necessities of man, we should then proceed to the use derived from them by animals, and finish with the situations which determine their varieties.

This order might be followed so much the more easily, as the first point of departure is fixed by the smell and the taste. The testimonies of those two senses are not to be slighted, for they serve to ascertain the intrinsic qualities of plants much better than the decompositions of chemistry. They may be extended to the whole vegetable kingdom, since there is not a single genus of plant umbelliferous, rosiform, or papilionaceous, but what affords an aliment to man in some part of the globe. The cyperus of Ethiopia bears at its root bulbs which have the taste of almonds. Those of the species known in Italy, by the denomination of *Trasi*, taste like chesnuts. We discover the potatoe in America among the class of solanums, which are poison. It is a jasmine of Arabia that furnishes us with coffee. The eglantine with us yields berries, fit only for the birds; but that of Yesso, which grows among the rocks and the shells on the sea-shore, produces a calix so large and so nourishing as to serve for food during a great part of the year, to the inhabitants of those shores. The ferns of our hills are barren; but a species of this plant, which grows in North America, and is called *Filix baccifera*, is loaded with berries which are good to eat. Nay, even the tree of the Molucca Islands, called *Libbi* by the inhabitants, and sago-palm by travellers, is nothing but a fern in the opinion of our botanists. This fern contains in its trunk the sago, a substance lighter and more delicate than rice. Lastly, there are even certain species of sea-weed that the Chinese eat as delicacies, among others that with which a kind of swallow constructs her nest.

By disposing, then, in this order, the plants which pro-

duce the principal subsistence of man, as the grasses, we should have, first, for our own country, the wheat of strong soils, the rye of sands, the barley of the rocks, the oats of humid situations, the buck-wheat of the rainy hills, and for other climates and exposures the pannic, the millet, the maize, the false oats of Canada, the rice of Asia, some species of which thrive in dry places, and others.

It would farther be of utility to ascertain to what part of the globe the origin of every eatable plant ought to be referred. What I have to say on this subject is nothing more than conjecture, but to me it appears extremely probable. I think then that Nature has placed in islands the species of plants that are the most beautiful, and best adapted to the necessities of man. In the first place, islands are more favourable to the elementary development of plants than the interior of continents, for there is not one of them but what enjoys the influences of all the elements, being surrounded by the winds and the sea, and frequently having in its interior plains, sands, lakes, rocks, and mountains. An island is a world in miniature. In the next place, their particular temperature is so varied, that we find some in all the principal points of longitude and latitude, though a considerable number are still unknown to us, particularly in the South Sea. Lastly, experience proves that there is not a single fruit-tree in Europe but what becomes more flourishing in some of the islands which are upon its coasts, than on the continent.* I have already mentioned the beauty of the chesnut-trees of Corsica and Sicily; but Pliny, who has preserved the origin of the fruit trees which were in Italy in his time, informs us that most of them had been brought from the island of the Archipelago. The walnut comes from Sardinia; the vine, the fig, the olive, and many other fruit-

* The observations of the author on this subject might perhaps be extended with propriety to vegetation in general. I remember to have heard many intelligent foreigners remark how powerfully they were struck on the first view of the English coast, with the beauty of the verdure with which our island is clothed, so much does it surpass that of any other country they ever beheld. T.'

trees were natives of other islands in the Mediterranean. He even observes that the olive, as well as various other plants, thrives only in the vicinity of the sea. All modern travellers confirm these observations. Tavernier, who had so often traversed the continent of Asia, says, that no olive trees are to be seen beyond Aleppo. An anonymous English traveller, whom I have already mentioned with commendation, declares, that no part of the continent produces fig trees, vines, mulberry, and other fruit-trees, that can be compared for magnitude and fecundity to those of the Archipelago, notwithstanding the carelessness of their unfortunate cultivators. To these might be added many other vegetables which flourish only in those islands, and which supply the commerce of Europe with gums, manna, and materials for dying. The apple-tree, so common in France, no where yields fruit so beautiful and species so various as on the shores of Normandy, under the breath of the western sea-breezes. No doubt the fruit, which was the prize of beauty, has like Venus, some favorite island.

If we extend our remarks to the torrid zone, we shall perceive that it is neither from Asia nor from Africa that we obtain the clove, the nutmeg, cinnamon, pepper of the best quality, gum-benjamin, sandal, sago, and other vegetable productions, but from the Molucca Islands, or those situated in the adjacent seas. The cocoa-tree thrives in all its beauty no where but in the Maldives. In the archipelagoes of those seas there are even a great number of fruit-trees, described by Dampier, which have not yet been transplanted into the ancient continent, such as the grape-tree. The double cocoa-nut is found only in the Sechelles Islands. The islands recently discovered in the South Seas, such as Otaheite, have presented us with trees before unknown, as the bread-fruit, and the species of mulberry whose bark serves to make cloth. The same may be said of the vegetable productions of the American islands, relatively to their continent.

These observations might be extended to the birds and

even to the quadrupeds, which are more beautiful, and of species more varied in the islands than elsewhere. The elephants held in the highest estimation in Asia are those of the island of Ceylon. The Indians ascribe to them something divine: and what is still more, they pretend that the other elephants acknowledge this superiority. So much is certain, that they fetch a much higher price in Asia than any others. In short, travellers the most worthy of credit, and who have made the most accurate observations, such as Dampier, Father du Tertre, and others assert, that there is not a rock in the seas comprehended between the tropics but what is distinguished by some kind of bird, crab, tortoise, or fish, which is not to be found elsewhere, either in such a variety of species, or such great abundance. I presume, therefore, that Nature has distributed her principal blessings among the islands to invite man to pass over to them, and to visit the whole earth. These are mere conjectures; but we are rarely mistaken when we ground them on the intelligence and the bounty of her author.

The most beautiful species of corn, which is wheat, might consequently be referred to Sicily, where it is actually said to have been first discovered. Fable has immortalized this discovery by making that island the scene of the amours of Ceres, and Naxos the birthplace of Bacchus, on account of the beauty of its vines. Thus much is certain, that corn is indigenous only in Sicily, if, however, it still propagates itself there spontaneously as the ancients asserted.* After having determined, in like manner, the other human adaptations of grasses to the different situations of the globe, we should seek those grasses which have marked relations to our domestic animals, as the ox, the horse, the sheep, the dog. They might be characterized by the names of those animals. We should have a *gramen bovinum, equinum, ovinum, cani-*

* In some work, which I cannot recollect, I have read that wheat has been found growing spontaneously in certain parts of the vast Asiatic portion of the Russian empire; and that some learned foreign writer has made use of this circumstance as an argument to prove that this country was the original cradle of the human race. T.

num. The species of each of these genera might afterwards be distinguished by the names of the different places where they are found by those animals, on the banks of rivers, on rocks, on sands, on mountains, so that by adding to them the epithets of *fluviatile, saxatile, arenosum, montanum*, we might express in two words all the long phrases of our systems of botany. The other grasses might in like manner, be divided among the different quadrupeds of our forests, as the stag, the hare, the boar, and the rest. These first determinations would require some experiments to be made on the tastes of animals, but they would be highly instructive and amusing. They would not be cruel, like most of those of modern physics, by which they are flead alive, poisoned, or suffocated for the purpose of discovering their natural disposition. They would be devoted to the observation of their appetites, and not of their convulsions. Besides, a great number of these preferences are known to our shepherds. One of them shewed me in the neighbourhood of Paris, a species of grass, which in a fortnight, fattens sheep more than the others would do in two months. Accordingly, whenever they perceive it, they hasten to it with the utmost avidity. Of this I have been an eye-witness. It is not my intention to assert that each species of animal confines its appetite to a single species of food. To establish the order which I am proposing, it is sufficient that each of them gives the preference to a particular species in each genus of plant, and this is fully confirmed by experience.

The great class of grasses being thus divided between man and animals, the other plants would be allotted with much greater facility, because they are far less numerous. Of the fifteen hundred and fifty species of plants discovered by Sebastien le Vaillant in the vicinity of Paris, there are more than one hundred families, among which the gramineous comprehends for its share eighty-five species, exclusive of twenty-six varieties, and our different kinds of corn. It is the most numerous, after the family of fungi, which

contains one hundred and ten, and that of mosses, which has eighty-six. Thus instead of the systematic classes of our botany, which give no explanation of the uses of most vegetables, which frequently intermix plants the most opposite, and separate others of the same genus, we should have an order simple, easy, agreeable, and of infinite extent, which, passing from man to animals, to vegetables, and to the elements, would point out to us the plants that are applicable to our use, and to that of sensible beings, would restore to each of them its elementary relations, to every spot on the face of the globe its vegetable beauty, and would fill the human heart with admiration and with gratitude. This plan appears to be so much the more conformable to that of Nature, as it is entirely comprehended in the benediction pronounced by her Author on our first parents, when he said to them—"Behold I have given unto you every herb bearing seed, which is upon the face of all the earth, and every tree in the which is the fruit of a tree yielding seed *after its kind;* to you it shall be for meat; and to every beast of the earth, and to every fowl of the air, and to every creeping thing, that creepeth upon the earth, wherein there is life, I have given every green herb for meat."*

This benediction is not confined, with regard to man, to any primordial species in each genus; it extends to the whole vegetable kingdom, which is converted into aliment for him by means of the domestic animals. Linnæus offered them the plants produced in Sweden, between eight and nine hundred in number, and he remarked that the cow eats two hundred and eighty-six; the goat four hundred and fifty-eight; the sheep four hundred and seventeen; the horse two hundred and seventy-eight; the hog one hundred and seven. The first of these animals refuses only one hundred and eighty-four; the second ninety-two; the third one hundred and twelve; the fourth two hundred and

* Genesis, Chap. I. ver. 29, 30.

seven; the fifth one hundred and ninety. In this enumeration he comprises only such plants as those animals eat with avidity, and such as they obstinately reject. The others are indifferent to them; they eat them when in want of others, and even with pleasure, when they are young. Not one of them is wasted. Those that are rejected by one, are the greatest delicacies to others. The most acrid, and even the most poisonous, serve to fatten some one or other. The goat browses on the ranunculus of the meadow, though as hot as pepper, on the milk-thistle, and the hemlock. The hog devours the horse-tail and the hen-bane. The celebrated philosopher did not extend this experiment to the ass, which does not live in Sweden, nor to the reindeer, which is such an excellent substitute for that beast in the regions of the north, nor to the other domestic animals, as the duck, the goose, the hen, the pigeon, the cat, and the dog. All these animals collectively seem destined to turn to our advantage every thing that vegetates, by their universal appetites, and above all by that inexplicable instinct of domesticity which attaches them to man, while it is impossible to be imparted to the stag, which is so timid, or to the small birds, which seek to live under our protection, as the swallow, that builds her nest in our houses. Nature has bestowed the instinct of sociability with man on such only whose services are capable of being useful to him in every season, and she has formed them in a most admirable manner for the different sites of the vegetable kingdom. I shall say nothing of the camel of the Arab, which can travel for several days together, without drinking, among the burning sands of Zara; nor of the reindeer of the Laplander, whose widely-cloven hoof is capable of supporting him while he runs over the surface of the snow; nor of the rhinoceros of the native of Siam and Pegu, which, by means of the folds in his skin, which he can distend at pleasure, disengages himself from the marshy grounds of those regions; nor of the elephant of Asia, whose foot, divided into five toes, is so sure on the

steep mountains of the torrid zone; nor of the lama of Peru, which with his forked feet climbs the rugged rocks of the Cordilleras. Every situation, however extraordinary, maintains a servant useful to man. But without quitting our own hamlets, the single-hoofed horse pastures in the plains, the heavy cow at the bottom of vallies, the sheep on the declivity of hills, the clambering goat on the edges of rocks; the long-snouted pig turns up the roots in the morasses; the duck and the goose feed upon fluviatic herbs; the hen picks up all that it is scattered about in the fields; the four-winged bee pillages the dust of flowers; and the swift pigeon gleans the seeds that are dropped upon inaccessible rocks. All the seanimals, after having occupied, during the day, the different sites of vegetation, return at night to the habitation of man, with bleatings, with buzzings, with shouts of joy, bringing him the pleasing tribute of plants converted by an inconceivable metamorphosis into honey, into milk, into butter, into eggs, and into cream.

I love to represent to myself those early ages of the world, when men travelled over the earth with their flocks and their herds, laying the whole vegetable kingdom under contribution. The sun invited them to advance to the extremities of the north with the spring, which goes before him, and to return with the autumn, which follows him. His annual course in the heavens seems to be regulated according to the progress of man over the earth. While this luminary is proceeding from the tropic of Cancer to that of Capricorn, a traveller, taking his departure from the equator on foot, might reach the shores of the Frozen Ocean, and afterwards return into the temperate zone as the sun withdraws from him, at the rate of not more than four or five leagues a day, without being exposed, during his whole journey, either to the sultry heat of summer, or the chilling cold of winter. Guided by the annual course of the sun, some Tartar hordes still perform their peregrinations. What a spectacle must the earth

have exhibited to its first inhabitants, when every thing was in its natural place, and it had not yet been degraded by the injudicious labors or by the madness of man! I presume that they took their departure from India, the cradle of the human race, and advanced toward the north. They first crossed the lofty mountains of Bember, covered with everlasting snows, which incircle like a rampart the happy country of Cashmir, and separate it from the burning kingdom of Lahor. They appeared to their view like immense amphitheatres of verdure, producing towards the south all the vegetables of India, and towards the north all those of Europe. They descended into the vast bason inclosed by them, and there beheld a part of the fruit trees destined to enrich our orchards. The apricot of Media and the peach of Persia, bordered with their blossomed branches the lakes and streams that water that delicious country. On leaving the ever-verdant vallies of Cashmir, they soon penetrated into the forests of Europe, and reposed beneath the foliage of the stately beech, and the tufted elm, which had before shadowed only the loves of the feathered tribes, and which no poet had ever sung. They traversed the boundless meads washed by the Irtish, expanded like oceans of verdure, and here and there diversified with long beds of yellow lilies, with stripes of ginseng, and with tufts of broad leaved rhubarb. Proceeding along its banks, they plunged into the forests of the north, beneath the majestic branches of the pine, and the moveable foliage of the birch-tree. What smiling vallies opened to their view along the rivers, inviting them to deviate from their course, and promising them objects still more lovely! What hills enamelled with unknown flowers, and crowned with aged and venerable trees, tempted them to proceed no farther! Arriving on the shores of the Frozen Ocean, another order of things arose to their view. There was no longer any night; the sun revolved round the horizon, and fogs, dispersed through the air, repeated his rays on different planes, in purple rainbows and daz-

zling parhelions. But if augmented magnificence dwelt in the heavens, desolation pervaded the face of the earth The Ocean was studded with masses of floating ice, which appeared at the horizon like towers and cities in ruins; and on the land, instead of groves, nothing was to be seen but shrubs stunted by the winds, and instead of meadows, rocks covered with mosses. Here the flocks that accompanied them undoubtedly perished, but even here Nature had provided for the necessities of man. These shores were formed of thick beds of coal; the seas swarmed with fishes, and the lakes with fowl. Among the animals they wanted assistants and servants; the rein-deer appeared in the midst of the mosses; she tendered to those wandering families the services of the horse in her speed, the fleece of the sheep in her fur; and shewing them, like the cow, her four teats with a single nurseling, she seemed to tell them that, like that animal, she was destined to share her milk with mothers oppressed by a too numerous ›geny.

But the East must have been the part of the earth hich first attracted the notice of men. At a time when none of our systems had yet biassed their opinions, the point of the horizon where the sun rises undoubtedly engaged all their attention. On beholding that luminary advancing each day from the same quarter, they must have been persuaded that he had there a fixed habitation, and that he had another in the spot where he reposed each night. These ideas, confirmed by the evidence of their eyes, were undoubtedly natural to men without experience, who had attempted to raise a tower to heaven, and who, even amid enlightened ages, believed as a point of religion, that the sun was drawn by horses in a chariot, and retired every night to repose in the arms of Thetis. I presume that they determined to proceed in quest of him to the east, rather than to the west, thinking they should greatly abridge their journey by going to meet him. It was this opinion, I should imagine, which caused the west to be

long uninhabited, under the same latitudes that were peopled in the east, and which accumulated such multitudes of inhabitants in the eastern extremity of our continent, where was formed the first and most populous empire in the world, namely, that of China. What farther confirms me in this belief that the first men who advanced eastward were engaged in this research, and hastened forward to attain their object is this, that, having, like the founders of other countries, taken their departure from India, the cradle of the human race, they did not, like them, people the earth progressively, as Persia, Greece, Italy, and Gaul were peopled one after the other from east to west; but leaving desert the vast and fertile countries of Siam, Cochin-China, and Tonquin, which are still at this day half barbarous and uninhabited, they proceeded without stopping till they reached the Eastern Ocean, and gave to the islands which they perceived at a distance, and which their want of ingenuity long prevented them from visiting, the appellation of Gepuen, which we have transformed into Japan, and which, in the Chinese language, signifies the birth-place of the sun.

Father Kircher assures us that when the first Jesuit mathematicians arrived in China, and there reformed the calendar, the natives of that country believed that the sun and moon were no larger than they appear to the eye; that when they set, they retired into a deep cavern, whence they again issued at their rising, and that the earth was a flat and uniform surface. These ideas, originating in the first evidence of the senses, were common to all nations. Tacitus, who has written history with such profound judgment, has not disdained, in treating of the history of Germany, to record the traditions of the western nations, who affirmed that the place where the sun set was toward the north-west, and that they could hear the noise which he made when he plunged into the waves.

It was, therefore, toward the east that the luminary of

day first attracted the curiosity of men. There were likewise tribes which directed their course toward that part of the globe, taking their departure from the southernmost point of India. These advanced along the peninsula of Malacca, and becoming familiarized with the ocean, along whose coasts they proceeded, they resolved to avail themselves of the united accommodation which the two elements afford to travellers, by navigating from island to island. In this manner they traversed that vast belt of islands which Nature has placed in the torrid zone, like a bridge intersected by canals for the purpose of facilitating the communication of the two worlds. When baffled by tempests or by contrary winds, they drew their barks on some shore, sowed seeds in the ground, reaped the crop, and waited for fairer weather or a more favorable season before they reimbarked. It was thus that the first navigators performed their voyages, and that the Phœnicians, sent out by Necho, king of Egypt, made the circuit of Africa in three years, taking their departure from the Red Sea, and returning by the Mediterranean, according to the account of Herodotus. When the first navigators perceived no more islands at the horizon, they paid attention to the seeds wafted by the ocean to the shores of those in which they were, and to the flight of birds as they withdrew from it: on the faith of these indications they steered towards lands which they had never seen. It was thus they discovered the vast archipelago of the Moluccas, the islands of Guam, of Quiros, of the Society, and undoubtedly many others which are still unknown to us. There was not one but what invited them to land upon it by some particular accommodation. Some, reclined on the billows like Nereids, poured from their urns rills of fresh water into the sea: it was thus that Juan Fernandez, with its rocks and cascades, presented itself to commodore Anson in the South Sea. Others, on the contrary, in the same ocean, having their centres hollowed out and their circumferences elevated and crowned with

cocoa-trees, afforded to their canoes basins secure in every season, replenished with fishes and sea-fowl: such is that called Waesserland, or the land of water, discovered by the Dutch navigator Schouten. Others, in the morning, appeared to them on the bosom of the azure waves resplendent with the light of the sun, like that of the same archipelago, which is denominated Aurora. Others announced themselves amid the darkness of night, by the flames of a volcano, like a pharos in the bosom of the waters, or by the odoriferous emanations of their perfumes. There is not a single one of them whose woods, whose hills, and whose meads do not produce some animal naturally gentle and familiar, but which is rendered wild by the experience it acquires of the cruelty of man. As they disembarked on their strands, they beheld birds of paradise with silken plumage, blue pigeons, cockatoos perfectly white, loris all over red, fluttering around them. Every new island tendered them new presents; crabs, fishes, shell-fish, pearl-oysters, lobsters, tortoises, ambergris; but the most agreeable were undoubtedly the vegetables. Sumatra displayed on her shores the pepper plant, Banda the nutmeg, Amboyna the clove, Ceram the sago palm, Flores gum benjamin and sandal-wood; New Guinea groves of cocoa-trees; Otaheite the bread-fruit. Each island rose from the midst of the sea like a vase supporting some precious vegetable. When they discovered a tree laden with unknown fruit, they broke off a few of its branches, and ran with shouts of joy to meet their companions and to exhibit to them this new benefit of Nature. It is from these early voyages, and these ancient customs, that the practice of consulting the flight of birds previous to undertaking a journey, and of meeting strangers with a branch of a tree in the hand, in token of peace and of joy at the sight of a present from heaven, has been diffused among all nations. These customs still exist among the islanders of the South Sea, and the independent tribes of America. But it was not fruit-trees alone that engaged

the attention of the first men. If any heroic deed, any irreparable loss had excited their admiration or their regret, the nearest tree was ennobled by it. They preferred it with those fruits of virtue or of affection to such as yielded nourishment or perfumes. Thus in the islands of Greece and Italy, the laurel became the emblem of triumph, and the cypress that of everlasting grief. The oak furnished wreaths of honor for the deserving citizen, and simple grasses decorated the brows of those who had saved their country. O Romans! ye were a people worthy the empire of the world, for having opened to all your subjects the career of honourable distinction, and for having selected the most common herb of the field as the mark of the most resplendent glory, that a crown might be found for virtue on every spot of the globe.

Allured by such attractions as these from island to island, the nations of Asia reached the New World, where they landed on the coasts of Peru. Thither they carried the name of children of that sun which they sought. This brilliant chimera conducted them across the American continent. It was not dissipated till they arrived at the shores of the Atlantic Ocean, but it was diffused over the whole continent, where the chiefs of most of the nations still retain the title of the Children of the Sun.*

* It is not my intention to assert that America was peopled only from the islands of the South Sea. I have no doubt that it likewise received inhabitants from the north of Asia and Europe. Nature always presents to men various means for the attainment of the same end. But the principal population of the New World came from the islands of the South Sea. This I am able to prove from a multitude of monuments which still exist, and the principal of which I shall enumerate. It is demonstrated by the worship of the Sun, established in India, in the islands of the South Sea, and in Peru, as well as by the title of Children of the Sun, assumed by different families in those countries; by the traditions of the Caraibs, scattered over the Antilles and Brasil, who say that their ancestors came from Peru; by the very establishment of the monarchy of Peru, and likewise that of Mexico, situated on the west coast of America, towards the islands of the South Sea; by the populousness of those nations, which were far more powerful and more civilized than those which inhabited the east coast, which renders it probable that the former were of much higher antiquity; by the prodigious extension of the Otaheitan language, the different dialects of which are diffused in most of the islands of the South Sea, and of which many words are to be found in the language of Peru, as a writer of great learning has lately

Amidst such a profusion of blessings mankind has continued wretched. There is not a single genus of animal, proved, and even in that of the Malays of Asia, in which I myself discovered several, such as *maté*, which signifies to kill; by the customs common and peculiar to the nations of the peninsula of Malacca, of the islands of Asia, of those of the South Sea, and of Brasil, which are not inspired by Nature, such as that of making fermented and intoxicating liquors, by chewing certain herbs and roots; by the channels of the commerce of antiquity which flowed in this direction, such as that of gold, which was very common in Arabia and India at the time of the Romans, though there are very few mines of that metal in Asia; but particularly by the trade in emeralds, which must have followed that track in the ages of antiquity to reach the old continent, in which not a single mine of that description is to be found. I shall quote what is said on this subject by Tavernier, a writer of credit, when treating of the commerce of Asia, and especially that in precious stones. "It is an ancient error," says he, "into which many persons have fallen, to imagine that the emerald is found originally in the East. Most jewellers, when they see an emerald of a high color, will tell you that it is an eastern emerald. But they are mistaken, for I am well assured that the East never produced one, either on the continent or in the islands. I made particular enquiries on this subject in all my journies." Tavernier had made six journies by land through India. It must therefore be concluded that the emeralds, so highly valued by the ancients, came from America, through the islands of the South Sea, through those of Asia, through India, through the Red Sea, and finally through Egypt, where they procured them.

To this may be objected the difficulty of navigating against the regular east winds, in order to pass from Asia to America under the torrid zone: but on this head I shall repeat, that the regular winds never blow there from the east, but from the north-east and south-east, and depend so much the more on the two poles the nearer you approach to the Line. This oblique direction of the wind was sufficient for people navigating from island to island, and who had contrived barks least liable to be driven out of their course, like the double proas of Guam, the form of which seems to have been preserved in the double canoes of the coast of Peru. Schouten met with one of these double proas at sea, more than six hundred leagues from the Island of Guam, towards America. Besides, it appears that the South Sea has likewise its monsoons, which have not yet been observed. Hear what is said on the variation of the winds by an English navigator, who sailed round the world in the same ship with Messrs. Banks and Solander in the years 1768, 1769, 1770, and 1771. "The inhabitants of Otaheite trade with those of the adjacent islands lying to the east of that island, and which we had discovered on our passage. For three months of the year, the wind, which blows continually from the west, is extremely favorable for this traffic." In these latitudes Commodore Anson likewise met with west winds which retarded him. Captain Cook confirmed this observation in his third voyage.

Some philosophers explain the correspondencies which are found between the natives of islands and those of continents, by supposing that the islands are the remains of countries swallowed up by the ocean, of which nothing is now left but these elevated summits, with a few of the inhabitants. But we have said sufficient in this work to demonstrate that maritime islands are not the fragments of any continent, but that they have mountains, peaks, lakes, and hills proportionate to their extent, and disposed conformably to the regular winds which blow over their seas. They have

but what lives in abundance and in liberty, the greates part without labor, all in peace with their species, all united to the objects of their choice, and enjoying the satisfaction of reperpetuating themselves in their families; and yet more than one half of mankind is doomed to celibacy. The other half curses the bands which have joined them. Most of them dread the thoughts of progeny, apprehensive lest they should not be able to procure subsistence for them. In order to earn a livelihood themselves, most are subjected to laborious employments, and are reduced to the condition of slaves to their fellow-creatures. Whole nations are in danger of perishing of famine; others, without territory, are heaped one upon another, while the greatest part of the globe is a desert. There are many lands which have never been cultivated; but there is not any, with which Europeans are acquainted, that has not been stained with human blood. The very solitudes of the ocean engulph in their abysses ships filled with men, sunk by the hands of men. In cities apparently so flourishing with their

vegetables which are peculiar to them, and no where else attain the same degree of beauty. Besides, if these islands had formerly constituted a part of our continent, we should find in them such of our quadrupeds as are to be met with in every climate. Yet, if we may believe the testimony of the Spanish historian Herrera, and of Father du Tertre, there were neither rats nor mice in America and the West India Islands previous to the arrival of the Europeans. The ox, the ass, the camel, the horse ought likewise to have been found in them, but they contained none of these animals; though they had abundance of poultry, ducks, dogs, and swine, like the islands of the South Sea, which are equally destitute of domestic animals. It is obvious that such animals as the horse and cow were too large and too heavy, notwithstanding their utility, to be conveyed in the little canoes of the first navigators, who would not fail to take particular care not to transport with them such vermin as rats and mice. But, to return to the general laws of Nature. If all the islands of the South Sea had once formed a continent, there would consequently have been no sea in the space which they occupy. Now it is certain that were they this day deprived of the ocean which incircles them, and the regular wind which blows over them, they would be blasted with sterility. The islands of the South Sea form a real bridge of communication between Asia and America, with only a few arches of which we are acquainted, and of which it would not be difficult to discover the remainder by means of the other concordances of the globe. But I shall here conclude my conjectures on this subject. I have advanced sufficient to demonstrate that the same hand which has covered the earth with plants and animals for the service of man, has not neglected the different parts of his habitation.

arts and their monuments, pride and cunning, superstition and impiety, violence and perfidy are ever at variance, and fill their unfortunate inhabitants with anguish. The more society is polished in them, the more numerous and the more cruel are the woes by which they are oppressed. Can it be that men are industrious there only because they are miserable? Wherefore has the empire of the globe been conferred on one single animal, who possesses not the command over his own passions? How happens it that man, feeble and transitory, should be governed by passions at once ferocious and generous, base and immortal? How is it, that, born without instinct, he has acquired such a variety of knowledge? He has imitated all the arts of Nature, except that of being happy. All the traditions of mankind have preserved the origin of these strange contradictions; but religion alone affords an explanation of their cause. She informs us that man is of a different order from the rest of animals, that his perverted reason has offended the author of the universe; that, as a just punishment, he has abandoned him to the direction of his own understanding; that he cannot form his reason but by the study of universal reason in the works of Nature, and in the hope which virtue inspires; that by these means alone he is enabled to rise above the animals beneath the level of which he has fallen, and return, step by step, in the path that leads up to the celestial mountain from which he has been precipitated.

Happy in these days is he, who, instead of mingling in the bustle of the world, lives far remote from men. Happy is he who knows nothing beyond his own horizon, to whom the very next village is a foreign country! He has not left his heart with beloved objects which he shall never more behold, nor his reputation at the mercy of the wicked. He believes that innocence resides in the rural hamlet, honor in palaces, and virtue in temples. His glory and his religion consist in dispensing happiness on all around him. If he sees in his gardens neither the fruits of Asia nor the

shades of America, he at least cultivates the plants that delight his wife and children. He needs no monuments of architecture to dignify his landscape. A tree, beneath whose shade a virtuous man has reposed, suggests to him sublime recollections: the poplar in the forest reminds him of the combats of Hercules, and the foliage of the oak calls to his remembrance the crowns of the Capitol.

STUDY XII.

OF SOME MORAL LAWS OF NATURE.

WEAKNESS OF REASON—OF FEELING—PROOFS OF THE DIVINITY, AND OF THE IMMORTALITY OF THE SOUL, FROM THE FEELINGS.

UCH are the physical demonstrations of the existence of e Deity which the imbecility of my reason has permitted me to arrange. I have collected, perhaps, ten times as many; but I perceived that I was still only at the beginning of my career; that the farther I advanced, the more extensive was the field that presented itself to my view; that I should soon be overwhelmed with my own labor, and that, according to the idea of Scripture, after a complete survey of the works of the creation, nothing would remain to me but the most profound astonishment.

It is one of the great misfortunes of human life, that, in proportion as we approach the source of truth, it retreats from us, and that when we catch by accident some of its ramifications, we are unable to remain constantly attached to them. Why has the sentiment which yesterday exalted me to heaven, at sight of a new relation of Nature,

to-day disappeared? Archimedes did not always remain in an extacy of joy from the discovery of the relations of the metals in the crown of king Hiero. He afterwards made other discoveries, more congenial to his mind, such as that of the cylinder circumscribed within the sphere, which he ordered to be engraved on his tomb. Pythagoras in time contemplated with indifference the square of the hypothenuse, for the discovery of which he is said to have vowed a whole hecatomb to Jupiter.

I recollect that when I first became master of those sublime truths, I felt a joy almost as lively as that experienced by the great men who were the inventors of them. Why is it extinguished? Why do I now require novelties to afford me pleasure? In this respect the animal is happier than we; what pleased him yesterday, will likewise delight him to-morrow; he has fixed limits which he never exceeds; and that which is sufficient for him, always appears to him beautiful and good. The ingenious bee constructs commodious cells; but she rears neither triumphal arches nor obelisks to decorate her waxen cities. A hut, in like manner, is sufficient for man, in order to be as well lodged as the bee. What need has he of five orders of architecture, of pyramids, of towers, of kiosques?

What then is that versatile faculty called reason, which I employ in the observation of Nature? It is, say the schools, a perception of correspondencies, which distinguishes man from the brute. Man possesses reason; the beast has only instinct. But if this instinct always points out to the animal what is most suitable to his wants, it must likewise be a reason, and a reason more precious than ours, since it is invariable, and is not acquired by long and painful experience. To this the philosophers of the past age replied, that the want of reason in beasts is proved beyond dispute by this circumstance, that they always act in the same manner: thus they concluded from the very perfection of their reason that they had none. Hence we may see to what a degree great names, pensions,

and societies can give currency to the greatest absurdities; for the argument of these philosophers directly attacks the supreme intelligence itself, which is invariable in its plans as the animals in their instincts. If the bees always construct their cells of the same form, it is because Nature always gives bees the same figure.

I mean not, however, to assert, that the reason of beasts and that of man are the same; ours is, beyond dispute, more extensive than the instinct of each animal individually: but if man is endowed with a universal reason, is it not because his wants are universal? He discovers, it is true, the wants of other animals; but is it not relatively to himself that he has made them his study? If the dog gives himself no concern about the oats of the horse, it is perhaps because the horse is not subservient to the wants of the dog. We have, however, natural adaptations which are peculiar to ourselves, such as agriculture and the use of fire. This knowledge would undoubtedly prove our natural superiority, were it not, at the same time, a demonstration of our wretchedness. The animals have no occasion to kindle a fire and to sow the ground, since they are clothed and fed by the hand of Nature; besides, several of them possess within themselves faculties far superior to our sciences, which are, in fact, foreign to us. If we have discovered some phosphoric substances, the luminous fly of the tropics has within itself a focus of light which illumines it in the night. While we are amusing ourselves with making experiments in electricity, the torpedo employs it as a defence; and while the academies of Europe are offering large sums to the person who shall discover the means of ascertaining the longitude at sea, the man-of-war bird daily flies three or four hundred leagues between the tropics from east to west, without ever failing to find at night the rock from which he took his departure in the morning.

It manifests another kind of insufficiency when philosophers attempt to employ in combating the intelligence

of Nature, that very reason which cannot assist them to discover it. Many plausible arguments are adduced concerning the danger of the passions, the frivolity of life, the loss of honor, of fortune, of children. You can easily unhouse me, divine Marcus Aurelius, and you too, sceptical Montaigne; but you do not provide for me another habitation. You put into my hands the staff of philosophy, and say—Walk on boldly; travel through the world begging your bread; you will be quite as hapoy as we in our splendid mansions, enjoying the society of our wives and the respect of our neighbors.—But here is an evil which you have not foreseen. In my native land, I have received nothing but calumny as the reward of my services; I have experienced nought but ingratitude on the part of my friends, and even of my patrons; I am lonely and destitute of the means of subsistence; I am tortured with nervous disorders; I stand in need of men, and my soul is shocked at the sight of them, when I recollect the fatal reasons which unite them, and that it is utterly impossible to interest them, unless by flattering their passions, and becoming vicious as themselves. Of what advantage is it to have studied virtue, which shudders at these recollections, and even without any reflection, at the mere sight of men? The first thing that fails me is that reason on which you desire me to lean. All your fine arguments vanish precisely at the moment when I have the greatest need of of them. Put a reed into the hand of a sick person; the first thing that will drop from him when overtaken by a fit of his disorder, is that same reed; and if he should ever venture to rest his whole weight upon it, he will break it, and probably run it through his hand. Death, you tell me, is a cure for every thing; but in order to die, I have no occasion for all this reasoning. Besides, I drop into the arms of death not in the vigor of life, but dying and reasoning no longer, though still continuing to feel and to suffer.*

* Thus Religion is greatly superior to Philosophy, because she supports us not by our reason, but by our resignation. She would not have us

What, after all, is that reason which is so much vaunted? Since it is nothing more than the relation of objects to our wants, it is consequently nothing more than personal interest. Hence it is that there are so many family reasons, reasons of associations, reasons of state; reasons of all countries, and of all ages; hence it is that the reason of a young man is one thing, and the reason of an old man another; that the reason of a woman differs from that of a hermit, and the reason of a soldier from that of a priest.

This sublime faculty moreover experiences, from the first moments of its expansion, shocks so violent as to incapacitate it, in some measure, for penetrating into the field of Nature. I say nothing of our methods, and of our systems, which diffuse a false light over the first principles of human knowledge, by shewing us truth only in books, in the midst of machinery, and upon the stage. I have said something concerning those obstacles in the objections which I have alledged against the elements of our sciences; but these maxims—Make a fortune—Be the first—which are instilled into us from our earliest infancy, are themselves sufficient to subvert our natural reason; they exhibit to us

proudly erect, but prostrate; not on the theatre of the world, but extended at the footstool of the throne of God; not anxious concerning futurity, but confident and composed. When books, honors, fortune, and friends forsake us, she presents us a pillow for our head; not the recollection of our frivolous and theatrical virtues, but that of our insufficiency; and instead of the arrogant maxims of philosophy, she requires of us nothing but calmness, peace, and filial confidence.

I shall make one more reflection on this reason, or, what is the same thing, this understanding of which we are so vain; namely, that it appears to be the result of our misfortunes. It is very remarkable that the nations most celebrated for their understanding, their arts, and their ingenuity, were the most wretched on the face of the globe from their governments, their passions, or their dissensions. Read the lives of most men eminent for the brilliancy of their intellectual faculties, and you will find that they were extremely miserable, especially in childhood. One-eyed persons, the lame, the deformed, possess in general more wit than other men, because, their figures being more disagreeable, they apply their reason to a more attentive observation of the relations of society, in order to escape its oppression. They are indeed accounted rather malicious; but this character perfectly applies to what society denominates wit. It is not Nature, however, which has rendered them malignant, but the raillery or the contempt of those with whom they have lived.

the just and the unjust only as related to our personal interest, and to our ambition; they usually attach us to the fortune of some powerful and reputable body, and render us, as it may happen, atheists or devotees, debauched or continent, Cartesians or Newtonians, according to the cause which has become our only ruling principle.

Let us then mistrust reason, since it misleads us from the very first step in the research after what is true and good. Let us enquire whether there is not within us some faculty more noble, more invariable, more comprehensive. Though I have nothing to offer, in the prosecution of this enquiry, but vague and indeterminate ideas, yet I hope that men more enlightened than myself, will one day establish and carry them much farther. It is in this confidence that, with the feeble means I possess, I am about to enter a career well worthy the attention of the reader.

Descartes lays down this maxim as the basis of the first natural truths: "I think, therefore, I exist." As that philosopher acquired very high reputation, which he merited besides by his knowledge in geometry, and especially by his virtues, his argument in proof of existence has been greatly applauded, and has acquired the authority of an axiom.

But, in my opinion, this argument is essentially defective in this respect, that it has not the generality of a fundamental principle; for it implicitly follows, that when a man ceases to think, he ceases to exist, or at least to have a proof of his existence. It likewise follows that animals to which Descartes denied the faculty of thought, had no proof that they existed, and that most created beings are in a state of non-existence with relation to us, because they frequently excite in us mere sensations of forms, of colors, of motions, without any thoughts. Besides, the results of human thoughts having been often employed, from their versatility in raising doubts concerning the existence of God, and even of our own existence, as was the case with the sceptic Pyrrho; this reasoning, like all the operations of the understanding, justly becomes liable to suspicion.

Instead, therefore, of the argument of Descartes, I substitute the following, which appears to me both more simple and more general: "I feel, therefore, I exist." It extends to all our physical sensations, which apprize us of our existence much more frequently than thought. It has for its moving principle an unknown faculty of the soul, which I call *sentiment*, to which thought itself refers; for the evidence to which we attempt to reduce all the operations of our reason, is itself simply sentiment.

I shall first demonstrate that this mysterious faculty differs essentially from physical sensations; and from the relations presented to us by reason, and that it mingles in a constant and invariable manner in every thing we do, so that it is, if I may be allowed the expression, human instinct.

With respect to the difference between sentiment and physical sensations, it is evident that Iphigenia at the altar produces impressions of a very different nature from those occasioned by the taste of a fruit or the perfume of a flower; and as to the distinction between it and the understanding, it is certain that the tears and the despair of Clytemnestra create in us emotions of a very different kind from those excited by a satire, a comedy, or, if you please, by a geometrical demonstration.

Not but that reason may sometimes terminate in sentiment when it presents itself with evidence; but the former is, with respect to the latter, only what the eye is with respect to the body, that is, the intellectual vision: besides, sentiment appears to me to be the result of the laws of Nature, and reason the result of political laws.

I shall give no farther definition of this obscure principle, but I shall render myself sufficiently intelligible if I make it felt. This, I flatter myself, I shall be able to accomplish, by opposing it, in the first instance, to reason. It is very remarkable that women, who are always much nearer to Nature, even in their very irregularities, than

men, with all their pretended wisdom, never confound these two faculties, and distinguish the first by the name of sensibility, or sentiment, by way of eminence, because it is, in fact, the source of our most delicious affections. They are perfectly on their guard against confounding, like most men, the mind and the heart, reason and sentiment. The one, as we have seen, is frequently our own work; the other is always that of Nature. They differ so essentially from each other, that if you wish to destroy the interest of a work replete with sentiment, you need only introduce into it an infusion of reasoning. This is a fault committed by the most celebrated writers, in all ages, in which society is completely separated from Nature. Reason produces many men of intelligence in the ages denominated civilized, and sentiment produces men of genius in those that are termed barbarous. Reason varies from age to age, and sentiment is always the same. The errors of reason are local and versatile; but the truths of sentiment are invariable and universal. 'Tis reason that makes the distinction of Greek, of Englishman, of Turk; but sentiment constitutes the man, the being of divine origin. At the present day we have need of commentaries in order to understand the books of antiquity, which are the productions of reason, such as those of most of the historians, and of the comic and satiric poets, as Martial, Plautus, Juvenal, and even those of the past age, as Boileau and Molière; but no one will ever require any in order to be moved by the supplications of Priam at the feet of Achilles, by the despair of Dido, by the tragedies of Racine, and the lively fables of La Fontaine. Many combinations are often necessary to disclose some hidden reason of Nature; but the simple and pure sentiments of repose, of peace, of mild melancholy, which she inspires, come to us without effort. Reason, I admit, procures us some pleasures; but if it discovers to us some portion of the order of the universe, it shews us, at the same time, our own destruction attached to the laws of its preservation; it exhibits to us

at once evils past and evils to come; it furnishes arms to our passions, at the same time that it demonstrates to us our insignificance. The farther it ranges, the more numerous are the testimonies of our nothingness which it brings back on its return to us; and so far from assuaging our pains by its researches, it frequently aggravates them by its discoveries. Sentiment, on the contrary, blind in its desires, embraces the monuments of every country and of every age; it flatters itself, in the midst of ruins, of carnage, of death itself, with the idea of a certain eternal existence; it pursues in all its appetites the attributes of the Deity, infinity, extent, duration, power, grandeur, and glory; it mingles the ardent desires of these with all our passions; it thus communicates to them a sublime impulsion, and while it subdues our reason, itself becomes the most noble and the most delicious instinct of human life.

Sentiment proves to us much better than reason the spirituality of the soul; for the latter frequently proposes to us as an object the gratification of our grossest passions,* whereas the latter is always pure in its desires. Besides, many natural effects which escape the one, are subject to the control of the other; such is, as we have already observed, evidence itself, which is nothing but sentiment, and over which reflection has no power: such is likewise our existence. The proof of it is not within the compass of our reason; for why is it that I exist? What is the reason of it? But I feel that I exist, and this sentiment is sufficient.

This being laid down, I proceed to demonstrate that there are two powers in man,† the one animal, the other

* Listen to reason, our philosophical moralists are continually repeating. But do they not perceive that they are putting us into the power of our greatest enemy? Has not each passion its respective reason?

† It is from want of attention to these two powers that so many celebrated works on man have a false coloring. Their authors sometimes represent him to us as a metaphysical object. You would imagine that the physical wants which assail even saints, were only trifling accessories to human life. They compose it entirely of monads, of abstractions, of moralities. Other

intellectual, of natures perfectly opposite, and forming human life by their union, as every harmony on earth is composed of two contraries.

perceive in man nothing but a mere animal, and discover in him only the grossest appetites. They never study him but with the dissecting knife in their hands, and when he is dead, that is, when he has ceased to be a man. Others know him only as a political individual; and distinguish him only by means of the correspondencies of ambition. It is not a man that interests them; it is a Frenchman, an Englishman, a prelate, a nobleman. Homer is the only writer I am acquainted with who has painted the entire man; others, even the best not excepted, exhibit nothing but a skeleton of him. The Iliad of Homer affords, in my opinion, a delineation of all mankind, as it does of all nature. All the passions are to be found there, with all their shades, the most intellectual and the most sensual. Achilles chants the praises of the Gods to the sound of his lyre, and boils a leg of mutton in a kettle. This last trait has given offence to our theatrical writers, who compose artificial heroes, who conceal their primary necessities, as the authors themselves disguise their own from society. All the passions of the human breast are to be found in the Iliad: furious wrath in Achilles; naughty pride in Agamemnon; patriotic valor in Hector; in Nestor unimpassioned wisdom; in Ulysses crafty prudence; calumny in Thersites; voluptuousness in Paris; faithless love in Helen; conjugal affection in Andromache; paternal love in Priam; friendship in Patroclus; and with these a multitude of intermediate shades of the same passions, such as the inconsiderate courage of Diomed and of Ajax, who dared even the Gods to the fight: then the oppositions of situation and of fortune which set off those characters; as the wedding and the rural festival on the terrible shield of Achilles; remorse in Helen, and solicitude in Andromache; the flight of Hector on the point of perishing under the walls of his native city, in the sight of his people, whose only defender he was; and the peaceful objects which presented themselves to him in that tremendous moment, such as the grove of trees and the fountain to which the females of Troy repaired to wash their robes, and where they loved to assemble in more prosperous days.

This divine genius having assigned to each of his heroes a principal passion of the human heart, and having set it in action in the most remarkable phases of life, has, in like manner, distributed the attributes of God to various Deities, and has allotted to them the different kingdoms of Nature; to Neptune the ocean; to Pluto the infernal regions; to Juno the air; to Vulcan fire; to Diana the forests; to Pan the flocks; in fine, the Nymphs, the Naiads, and the very Hours have all their respective departments on the earth. It produces not a single flower but what is under the superintendence of some divinity. It is thus that he has rendered the habitation of man celestial. His work is the most sublime of encyclopedias. All the characters he has employed so perfectly correspond with the human heart and with Nature, that the names by which he has designated them have become immortal. With the majesty of his plans, he combines a truth of expression which proceeds not solely from the beauty of his language, as some grammarians pretend, but from the extent of his observation of Nature. It is thus, for example, that he calls the sea *empurpled* at the moment the sun is setting, because the reflection of that luminary at the horizon then causes it to appear of that color, as I have myself remarked. Virgil, who has imitated him in every particular, is full of the beauties of observation, to which our commentators pay not the least regard. For example, in the Georgics, Virgil gives to the Spring the epithet of *blushing*. *Vere rubenti*

Some philosophers have thought proper to paint man as god. His attitude, say they, is that of command. But to have the attitude of command, the rest of his species must have that of obedience, otherwise he would find an enemy in each of his fellow-creatures. The natural empire of man extends only to animals; and in the wars which he wages with them, or the care which he bestows upon them, he is frequently obliged to exchange the attitude of an emperor, for that of a slave. Others represent him as the perpetual object of the wrath of Heaven, and have accumulated on his existence all the miseries that can make him abhor it. This is not a picture of man. He is not formed of a simple nature like the other animals, each of which invariably preserves its peculiar character, but of two opposite natures, each of which is subdivided into several passions, which contrast with each other. By one of these natures he combines in himself all the wants and all the passions of animals, and by the other the ineffable sentiments of the Deity. It is to this last instinct, much more than to his reflection, that he owes the testimony of the existence of God; for I suppose that possessing, by virtue of his reason, the faculty of perceiving the correspondencies which exist between the objects of Nature, he discovered the relations that subsist between an island and a tree, a tree and a fruit, a fruit and his wants; and would easily be induced, on seeing an island, to repair to it in quest of food: but his reason in shewing him the links of four natural harmonies, would not refer the cause to an invisible author if he had not that sentiment deeply impressed upon his heart. It would stop short at the limits of his perception, which are likewise the limits

is his expression. As his translators and commentators have neglected to notice this, as well as many others, I long imagined that it had been introduced merely to fill up the measure of the verse; but having remarked at the beginning of spring that the shoots and buds of most trees turned quite red before they threw out any leaves, I then comprehended what moment of the season it was that Virgil intended to describe by *vere rubenti*.

of the perceptions of animals. A wolf who swims across a river to reach an island, on which he perceives herbage, in the hope of finding sheep upon it, has as perfect a conception of the four natural relations between the island, the herbage, the sheep, and his own appetite; but he does not prostrate himself before the intelligent being by whom they were established.

Considering man as an animal, I know of none that can be compared to him for wretchedness. In the first place, he is naked, exposed to insects, to the wind, to rain, to cold, to heat, and is obliged in every country to clothe himself. If his skin acquires in time sufficient hardness to resist the attacks of the elements, it is not till after severe trials, which sometimes flay him from head to foot. He knows nothing naturally, like the other animals. If he wants to cross a river, he must learn to swim; nay, he is even obliged in his infancy to learn to walk and to speak.* There is no country so happily situated in which he is not under the necessity of preparing his food with great trouble. The banana and bread-fruit tree furnish him, between the tropics, with sustenance all the year round; but he must plant the trees, he must inclose them with thorny fences, to preserve them from the beasts; he must dry their fruits for a supply during the hurricane season; and he must build store-houses in which to lay them up. Besides, these useful vegetables are exclusively reserved for certain privileged islands; for, in the rest of the world, the cultivation of grain and of alimentary roots requires a multitude of arts and of precautions. When he has collected every comfort around him, love and voluptuousness, which are the offspring of abundance, avarice, thieves, hostile incursions disturb his enjoyments. He must have laws, judges, magazines, fortresses, confederacies, and regiments to defend from without and from within his ill-fated

* The very name of infant is derived from the Latin *infans*, that is, one who cannot speak.

corn-field. Finally, when he might enjoy with the tranquillity of a sage, languor takes possession of his heart; he wants comedies, balls, masquerades, diversions to prevent him from reasoning with himself.

It is impossible to conceive that a nation can exist with merely animal passions. The sentiments of natural justice, which are the basis of legislation, are not results of our mutual wants, as some have asserted. Our passions are not retrogressive; they have nothing but ourselves for their only centre. A family of savages, in the midst of abundance, would feel no more concern for the misery of their neighbors, than we concern ourselves at Paris whether our sugar and our coffee cost the wretched Africans rivers of tears.

Reason, united to the passions, would only increase their ferocity; for it would furnish them with new arguments long after their desires were gratified. In most men, it is nothing more than the relation of beings to their wants, that is, to their personal interest. Let us examine its effect combined with love and with ambition, which are the two tyrants of human life.

Let us first suppose a state entirely governed by love, such as that imagined to exist on the banks of the Lignon, by the ingenious D'Urfey. I ask who would there be at the labor of building houses and cultivating the land? Must we not suppose servants, whose labor compensates the indolence of their masters? Would not these servants be obliged to abstain from making love, that their masters might devote their whole attention to it? Besides, in what manner are the aged of both sexes to pass their time? A fine spectacle for them truly to behold their children incessantly indulging in the delights of love! Would not such a sight be to them a perpetual subject of regret, of ill-humour, and of jealousy, as among us? In truth, such a government, were it in one of the islands of the South Sea, beneath groves of cocoa and bread-fruit trees, where there would be nothing to do but to eat and

to make love, would soon be torn with discord and oppressed with languor. But supposing that social reason were to oblige each family to labor for itself, and to introduce more variety into their lives by summoning to its aid our arts and our sciences, it would soon accomplish their destruction. We must never expect to hear there any of those affecting dialogues which D'Urfey puts into the mouths of Astrea and of Celadon; they are suggested neither by animal love, nor by enlightened reason. Both of these employ a different kind of logic. When a lover, illumined by our science, would there inspire his mistress with the tender passion, if he had need of words to accomplish his purpose, he would talk to her of springs, of masses, of attractions, of fermentations, of the electric spark, and of other physical causes, which determine, according to the moderns, the propensities of the two sexes, and the movements of the passions. Political reasons would interpose to affix the seal to their union, by stipulating in the melancholy and mercenary language of our contracts for dowries, maintenances, redemptions, pin-money, post-obits. But the personal reason of each of the contracting parties would quickly separate them. As soon as a man saw his wife attacked by disease, he would say to her: "My temperament obliges me to seek a woman who enjoys health, and to abandon you." For the sake of consistency she would undoubtedly reply: "You do right to obey the dictates of Nature. I should likewise look out for another husband were you in my condition." A son would say to his aged and enfeebled father, "You begot me for your pleasure, it is time that I should live for mine." Where should we find the citizens who would unite to maintain the laws of such a society? the soldiers who would expose themselves to death to defend it? and the magistrates who would undertake to govern it? I say nothing of an infinite number of other disorders resulting from that blind and headstrong passion, even when directed by cool reason.

If, on the other hand, a nation were solely devoted to ambition, it would be still more speedily destroyed, either by external enemies, or by its own citizens. It is, in the first place, difficult to imagine how they could be reduced to any form under one legislator, for how is it possible to conceive that ambitious men would voluntarily submit to other men? Those who have united them, as Romulus, Mahomet, and all the founders of nations, commanded their attention only by addressing them in the name of the Deity. But supposing this to be affected in some manner or other, could such a society ever be happy? Let historians bestow what panegyrics they please on conquering Rome, can you imagine that her citizens were then truly happy? While they were spreading terror over the whole world, and causing its tears to flow, were there not at Rome hearts rent with anguish, and eyes that wept the loss of a son, of a father, of a husband, of a lover? And the slaves, who constituted the greatest part of her inhabitants, were they happy? Or was happiness the lot even of the general of the Roman army, crowned with laurels, and seated on a triumphal car, around which, in consequence of a military law, his own soldiers sung songs in which they reproached him with his faults, lest he should become proud? And when Providence permitted Paulus Emilius to triumph over a king of Macedon and his poor children, who extended their little hands to the Roman people to excite their compassion, it likewise decreed that the victor should, at the same moment, lose his own children, that no man might triumph with impunity over the tears of mankind. Yet this people, so strongly disposed to seek their own glory in the misery of others, were obliged, in order to dissemble their horror of it, to veil the tears of nations with the interest of the Gods, as we disguise with fire the flesh of animals which serve us for food.

Rome, conformably to the decree of fate, was to become the capital of the world. She armed her ambition with a

celestial reason, in order to render it victorious over the most formidable powers, and to restrain ferocity in its citizens, by inuring them to the practice of sublime virtues. What would they have become, had they abandoned themselves without restraint to this furious instinct? They would have resembled the savages of America, who roast their enemies alive, and devour their flesh still streaming with blood. To this state was Rome at length reduced, when her religion no longer presented any thing to her enlightened inhabitants but empty imagery. The two passions natural to the human heart, ambition and love, then invited within her walls the luxury of Asia, and the corrupting arts of Greece, proscriptions, murders, poison, conflagrations, and at length gave her up a prey to barbarous nations. The Theutates of the Gauls then issued from the forests of the north, and in his turn caused the Capitoline Jupiter to tremble.

Our reasons of state in modern times are less sublime, but they are not less fatal to the peace of mankind, as we may judge from the wars of Europe, which are incessantly disturbing the world. A nation wholly governed by its passions, and by mere reasons of state, would soon accumulate upon itself all the miseries incident to humanity; but Providence has implanted in man a sentiment which counterbalances their influence, by directing his desires far beyond the objects of this world; this sentiment is that of the existence of the Deity. Man is not man because he is a rational animal, but because he is a religious animal.

Cicero and Plutarch observed that at their time not a single nation was known among which some religion was not to be found. The sentiment of the Deity is natural to man. It is this light which St. John calls "the true light, which lighteth every man that cometh into the world." I find fault with many modern writers, and even missionaries, for having affirmed that certain nations were destitute of all sense of the Deity. It is, in my opinion, the blackest of calumnies with which a nation can be brand-

ed, because it necessarily denies that nation the possession of every virtue; and should it manifest the appearance of any virtue, this could be nothing more than the most odious of vices, namely, hypocrisy, for there can be no virtue without religion. But there is not a single one of those inconsiderate writers who does not himself furnish arguments which refute his own imputation; for some acknowledge that these atheistical nations pay adoration on certain days to the moon, or that they retire into the woods to perform ceremonies, the knowledge of which they carefully conceal from strangers. Among others, Father Gobien, in his History of the Marian Islands, having affirmed that the natives of them acknowledge no Deity, and have not the slightest idea of religion, informs us immediately afterwards, that they invoke the dead, whom they call *anitis*, whose skulls they keep in their houses, to which they ascribe the power of governing the elements, of changing the seasons, and of restoring health; that they firmly believe the immortality of the soul, and acknowledge a paradise and a hell. Most assuredly opinions like these demonstrate that they have ideas of the Deity.

All nations have a sense of the existence of God, for though they may not all raise themselves to him after the manner of a Newton and a Socrates, by means of the general harmony of his works, they at least dwell on those of his blessings which interest them most. The Indian of Peru adores the sun; he of Bengal, the Ganges, which fertilizes his plains; the black Jolof, the ocean, which cools his shores; the Samojede of the north, the rein-deer, which feeds him. The wandering Iroquois prays to the Spirits of the lakes and of the forests for abundant fisheries and chases. Many nations adore their kings. There is not one of them, which, to endear to mankind these august dispensers of their felicity, has not employed the intervention of some deity to consecrate their origin. Such are, in general, the Gods of the Nations; but when the passions darken among them this divine instinct, and min-

gle with it either the madness of ambition or the extravagancies of voluptuousness, we behold them prostrating themselves before serpents, crocodiles, and deities that delicacy forbids to mention. We see them offer in their sacrifices the blood of their enemies, and the virginity of their daughters. Such as is the character of a people, such is its religion. Man is so irresistibly carried along by this celestial impulse, that when he ceases to take the Deity for his model, he never fails to make one after his own image.

There are therefore in man two powers, the one animal and the other divine. The first is incessantly giving him the sentiment of his misery, and the second excites that of his excellence; from the conflicts of these result the varieties and contradictions of human life.

It is by the sentiment of wretchedness that we are rendered alive to every thing that presents us the idea of asylum and of protection, of comfort, and of accommodation; this is the reason why most men are fond of tranquil retreats, of abundance, and of all the blessings with which bounteous Nature has covered the earth to supply our wants. It was this sentiment that gave to Love the chains of Hymen, that man might one day find the partner of his pains in the companion of his pleasures, and that children might be ensured the assistance of their parents. It is this that makes the peaceful citizen so eager after the accounts of court-intrigues, after narratives of battles and descriptions of tempests, because external dangers augment internal happiness in his security. This sentiment often mingles with the moral affections; it seeks support in friendship, it looks for encouragement in commendation. It is this that makes us attentive to the promises of the ambitious man, when we are eager to follow him like slaves, seduced by the ideas of protection with which he deludes us. Thus the sentiment of our wretchedness is one of the strongest ties of our political societies, though it attaches us to the earth.

The sentiment of the Deity impels us in a contrary direction.* It was this that conducted Love to the altar, and dictated to it the first vows of fidelity; it offered the first children to Heaven, before the existence of political laws; it rendered Love sublime and friendship generous; with one hand it succoured the wretched, and with the other it opposed tyrants; it became the moving principle of generosity and of all the virtues. Satisfied with performing services to mankind, it disdained the tribute of applause. When it appeared in the arts and sciences, it became the charm which enraptured us; languor succeeded the moment it disappeared. It is this that confers immortality on men of genius, who disclose to us in Nature new relations of intelligence.

When these two sentiments cross each other, that is, when we attach the divine instinct to perishable things, and the animal instinct to divine objects, life is agitated by contradictory passions. This is the cause of all those frivolous hopes and fears which are the torment of man. "My fortune is made," says one; I have sufficient to support me *for ever*," and the next day he expires. "How wretched am I!" exclaims another; "I am ruined *for ever*"—and death delivers him from all his woes. "We are attached to life," said Michel Montaigne, "by mere trifles, by a glass;" yes, truly, because we convey to that glass the sentiment of infinity. If life and death frequently appear insupportable to men, the reason is because they associate with death the sentiment of their end, and with their life the sentiment of infinity. Mortals, if ve would

* He who has lost this first of harmonies is destitute of all the rest. It is a circumstance worthy of remark that all the works of atheists are dry and uninteresting They sometimes astonish, but they never touch the heart. They exhibit nothing but caricatures or gigantic images. They are destitute of order, of proportion, of feeling. The only exception from this censure is the poem of Lucretius. But this exception, as I have before stated, confirms my observation; for when that poet wished to please, he was made, the necessity of introducing the Deity, as may be seen in his exordium, *Alma Venus, &c.* In every other part of his performance, in which he explains the philosophy of Epicurus, he is insufferably dry.

live happy and die contented, pervert not the laws which Nature has established; consider that at death all the pains of the animal cease, that corporeal wants, disease, persecution, calumny, slavery of every kind, the rude conflicts of the passions with ourselves and with others are at an end. Consider that, at death, all the enjoyments of a moral being commence; the rewards of virtue, and the slightest acts of justice and humanity, undervalued or despised by the world, which have in some measure brought us near, even upon earth, to the Being righteous and eternal.

When these two instincts unite in the same place, they procure us the highest pleasures of which we are susceptible; for then our two natures, if so I may be allowed to call them, are gratified at once.* We shall present a slight sketch of the combination of their harmonies, after which we shall pursue the consideration of the celestial sentiment which is natural to us in the most common sensations.

Let me suppose you, then, reader, weary of the evils of civilized society, seeking toward the extremity of Africa some happy spot unknown to Europeans. Your vessel, sailing along the Mediterranean, is tossed by a tempest and shipwrecked on a strange coast just as it begins to grow dark. Favored by heaven, you escape, you take refuge in a grotto, which you discover by the lightning's glare, at the bottom of a little valley. Under the shelter of this asylum you hear all night the rolling of the thunder, and the rain descending in torrents. At day-break you discover behind you a range of lofty rocks, perpendicular as a wall. From their bases, here and there issue clumps of fig-trees, covered with fruit, white and red, and tufts of carobs, loaded with brown pods: their summits are crowned with pines, wild olives, and

* To these two instincts may be referred all the sensations of life, which frequently seem so contradictory. For example, if habit and novelty be agreeable to us, it is because habit gives us confidence with regard to our physical relations, and novelty promises new points of view to our divine instinct, which is ever striving to extend its enjoyments.

cypresses, bending with the violence of the winds. The echoes of these rocks repeat in the air the confused howling of the tempest, and the harsh roaring of the raging deep, which is perceived at a distance. But the little valley in which you are is the abode of calmness and tranquillity. In its mossy declivities the sea-lark builds her nest, and on its solitary strands the thrush awaits the cessation of the storm.

The first beams of Aurora are now lengthened over the flowery stæchas, and the violet beds of thyme which clothe the hillocks. By its rays you discover on the summit of a neighbouring eminence a cottage shadowed with trees. A shepherd, his wife, and daughter issue from it; they advance towards the grotto, bearing vessels and baskets on their heads. It is the spectacle of your disaster, which attracts these good people to you. They bring you fire, fruits, bread, wine, and clothing. They hasten to render you the offices of hospitality. The wants of the body being satisfied, those of the soul begin to claim your attention: your eyes wander over the deep, and you are anxious to ascertain on what part of the world you are thrown; but the shepherd relieves you from your solicitude, and thus addresses you: "That distant island which you see to the north is Mycone. There is Delos a little to the left, and Paros straight before you. This, in which we are, is Naxos; you are in that very part of the island where Ariadne was formerly abandoned by Theseus. It was on that long bank of white sand, which projects yonder into the sea, that she passed the days, with her eyes fixed on the point of the horizon, where the vessel of her faithless lover vanished from her sight; to this very grotto where you now are she retired at night, to mourn his departure. To the right, between those two hills, on the top of which you behold confused heaps of ruins, once stood a flourishing city called Naxos. The female inhabitants, touched with the misfortunes of the daughter of Minos, repaired hither to comfort her. They

first endeavoured to divert her by their conversation; but nothing could afford her pleasure, except the name and the recollection of Theseus. They then counterfeited letters from the hero, breathing the most ardent affection, and addressed to Ariadne. They flew with them to her, saying: 'Take comfort, beautiful Ariadne, Theseus will soon return; Theseus still thinks of you.' Ariadne, transported with joy, read the letters, and with a trembling hand hastened to answer them. The Naxian girls took charge of her answers, and promised to send them with all possible speed to Theseus. In this manner they amused her grief. Perceiving, however, that the sight of the sea plunged her more and more into melancholy, they conducted her into the midst of those extensive groves which you observe yonder in the interior of the island. There they invented all sorts of amusements to dissipate her chagrin. Sometimes they formed around her choral dances, and taking each other by the hand, they imitated the different windings of the labyrinth of Crete, out of which, by her assistance, the happy Theseus had escaped: sometimes they represented the death of the terrible Minotaur. Ariadne's bosom expanded with joy on beholding spectacles which recalled to her mind the power of her father, the glory of her lover, and the triumph of her charms, which had retrieved the destiny of Athens: but when the winds, in spite of the music of the tabor and the flute, wafted to her ear the distant murmur of the waves breaking against the shore from which she beheld the cruel Theseus take his departure, she turned towards the sea and burst into tears. Thus the Naxians perceived that disappointed love finds, even in the midst of amusements, the means of aggravating its woes, and that we lose not the recollection of pain till we lose that of pleasure. They, therefore, endeavored to remove Ariadne from scenes and sounds that reminded her of her lover. They prevailed upon her to visit their city, where they provided for her grand entertainments, in magnificent

halls, supported by columns of granite. Into these places no man was permitted to enter, and no noise from without could there be heard. They covered the floor, the walls, the doors, and the windows with tapestry, on which they had represented meadows, vineyards, and delightful solitudes. The halls were illumined with lamps and torches. They made Ariadne seat herself in the midst of them on cushions; they put a crown of ivy, with its black berries on her flaxen hair, and around her pale forehead; they then placed at her feet urns of alabaster, replenished with generous wines; they poured them into cups of gold, which they presented to her, saying: 'Drink, lovely daughter of Minos; this island produces the richest presents of Bacchus. Drink—wine dissipates grief.' Ariadne, smiling, complied with their invitation. In a short time the roses of health again appeared on her cheeks, and the report was immediately circulated throughout Naxos, that Bacchus was come to the relief of the mistress of Theseus. The inhabitants, transported with joy, raised a temple to the God, of which you still see some columns and the front, upon that rock surrounded by the waves. But wine only added strength to the passion of Ariadne. She at length pined away, a victim to her grief, and even to her hopes. See there, at the farther end of that valley, on a little hillock covered with marine wormwood, is her tomb, with her statue still looking towards the sea. You can scarcely distinguish in it the figure of a woman; but you may still discover the restless attitude of a lover. This monument, like all the others of this country, has been defaced by time, and mutilated still more by the hands of barbarians; but the memory of suffering virtue, on earth, is not in the power of tyrants. The tomb of Ariadne is in the hands of the Turks, and her crown is among the stars. As for us, concealed by our very obscurity from the notice of the powers of the world, we have, thanks to Heaven, found liberty far remote from the great, and happiness in the midst of deserts. Stranger, if the blessings

of Nature have any charms for you, it is in your power to share them with us." At this narrative delicious tears trickle from the eyes of his wife and of his youthful daughter, who heaves a sigh to the memory of Ariadne; and I doubt whether an atheist himself, who discovers in Nature no other laws than those of matter and of motion, could remain insensible to present harmonies, and ancient recollections.

Voluptuous men! Greece alone, you will tell me, presents scenes and points of view so affecting.

Ariadne, therefore, has a place in every garden; Ariadne is seen in every collection of paintings. From the turrets of your castles, throw your eyes over the plains beneath: their distant horizons present prospects more beautiful than those of desolated Greece. Your apartments are more commodious than a grotto, and your sofas are softer than the turf. The undulations and the murmurs of the herbage of your meads are more pleasing than those of the billows of the Mediterranean. Your money and your gardens supply you with a greater variety of wines and fruits than are to be found in the whole Archipelago. Would you mingle with these enjoyments the sensation of the Deity? Behold on yonder hill that small parish church encircled with aged elms. Among the females who assemble beneath its rustic porch, there is undoubtedly some Ariadne, betrayed by her lover.* She is not of marble, but of flesh and blood; she is not a Greek, but a French-woman; she

* There are in our own plains young females much more respectable than Ariadne, of whom our historians, who expatiate so largely on virtue, scarcely take any notice. A person of my acquaintance, one Sunday observed at the door of a village church a young woman praying all alone, while the congregation were chanting the vespers within. As he remained some time at the place, he observed, on the succeeding Sundays, that the same young woman never entered the church during the service. Struck with this singularity, he asked the reason of it of some other female peasants, who replied, that it was undoubtedly a whim of her own to stop at the door, since nothing prevented her from going in, adding that they had often urged her to enter, but in vain. At length, being extremely desirous of an explanation, he addressed the young woman herself, whose conduct appeared so extraordinary. She at first appeared somewhat disconcerted; but soon recovering herself, she replied: "Sir, I had a lover who took ob-

eceives not consolation, but contempt from her companions. Repair to her humble cottage, and alleviate her misery. Do good in this life, which passes away with the rapidity of a torrent. Do good not out of ostentation, and by the hands of others, but for the sake of heaven, and with your own hands. The fruit of virtue loses its flavor when it is plucked by the hand of another. Ah! if you would yourself pour the balm of consolation into her wounds, if by your compassion you would reinstate her in her own esteem, you would behold her face covered with a blush, her eyes swimming in tears, her convulsive lips move without speaking, and her heart, long oppressed by shame, expand at the approach of a comforter as to the sentiment of the Deity. You will then perceive in the human figure touches unknown to the chisels of the Greeks, or the pencil of Vandyke. The felicity of an unfortunate female will cost you less than the statue of Ariadne; and instead of conferring lustre on the name of an artist, in your hotel, for a few years, it will immortalize your own, and cause it to last long after you shall be no more, when she will say to her companions and to her children: "It was a god who rescued me from misery."

We shall now proceed to trace the instinct of the Deity in our physical sensations, and shall conclude this study by the sentiments of the soul which are purely intellectual We shall thus afford a faint idea of the nature of man

OF PHYSICAL SENSATIONS.

All physical sensations are in themselves testimonies of our wretchedness. If man is so sensible to the pleasure of the touch, it is because his body is naked all over. To clothe himself he is under the necessity of stripping the quadrupeds, the plants, and the insects If almost all vege-

vantage of my frailty. I became pregnant, and my lover, falling sick, died without making me his wife. It is my desire that my exclusion from the church should serve as an expiation of my fault, and as a warning to my companions."

tables and animals are laid under contribution to supply him with food, it is because he is obliged to employ a great variety of preparations and combinations in his aliments. Nature has treated him with much severity, for he is the only animal for whose necessities she has made no immediate provision. Our philosophers have not sufficiently reflected on this extraordinary distinction. What! shall a worm have its auger or its file, shall it burst into life in the bosom of a fruit, in the midst of abundance; shall it afterwards find within itself the materials for weaving a garment to cover it; shall it then be transformed into a gaudy butterfly, which, devoting himself to love, propagates his species, without care and without remorse—while the son of a king is born quite naked, amidst tears and groans, standing in need all his life of the service of others, obliged to maintain an incessant conflict with his own species, both without and within, and frequently finding in his own breast his greatest enemy! Surely if we all are nought but children of the dust, it would be a thousand times preferable to come into existence in the form of an insect than in that of an emperor. But man has been abandoned to the most abject misery, only that he might incessantly have recourse to the first of powers.

OF TASTING.

There is no physical sensation but what excites in man some sentiment of the Deity.

To begin with the grossest of all our senses, which relates to eating and drinking, all nations in the savage state have entertained a belief that the Deity stood in need of the same means of supporting life as men; hence was derived, in all religions, the origin of sacrifices. Hence likewise proceeded, among many nations, the custom of placing food upon the tombs: the women, among the savages of America, even extend this duty to infants at the breast who are snatched from them by death. After they have be-

stowed on them the rites of sepulture, they go every day and press from their breasts a few drops of milk on their little grave: this is attested by the Jesuit Charlevoix, who was frequently an eye witness of the fact. Thus the sentiment of the Deity, and that of the immortality of the soul, are closely combined with our affections the most completely animal, and especially with maternal love.

But man was not satisfied with admitting intellectual beings to a participation in his food, and with inviting them, in some measure, to his table; he has endeavoured to elevate himself to them, by means of the physical effect of these same aliments. It is very remarkable that several savage nations have been discovered, who possessed scarcely industry sufficient to procure themselves food, but not one which had not been at the pains to obtain the means of intoxication. Man is the only animal who is sensible of this pleasure. The brutes are content to remain within their proper sphere; man is continually striving to get out of his. Intoxication elevates the mind. All religious festivals among savages, and even among polished nations, are succeeded by entertainments in which men drink till they have lost their reason; they begin indeed with fasting, but conclude with inebriation. Man renounces human reason to excite in himself emotions that are divine. The effect of drunkenness is to convey the soul into the bosom of some deity. You always hear topers celebrating in their songs Bacchus, Mars, Venus, or the god of Love. It is farther very remarkable that men never abandon themselves to blasphemy but when they are in a state of intoxication; for it is an instinct as common to the soul to seek the Deity, when in its natural state, as to abjure him when corrupted by vice.

OF SMELLING.

The pleasures of smelling are peculiar to man, for I do not comprehend under this head the olfactory emanations

by which he judges of his food, and which he has in common with the greatest part of animals. Man alone is sensible to perfumes, and he employs them to give greater energy to his passions. Mahomet said that they elevated his soul toward heaven. Be this as it may, the use of them has been introduced into all the religious ceremonies, and into the political assemblies of many nations. The Brasilians, as well as all the savages of North America, never deliberate on any important subject without smoking tobacco in a calumet. From this custom the calumet has become among all those nations the emblem of peace, of war, of alliances, according to the accessories by which it is accompanied. It was undoubtedly from the same custom of smoking, which was common among the Scythians, as Herodotus relates, that the caduceus of Mercury, which bears a striking resemblance to the calumet of the Americans, and which, like the latter, appears to have been nothing but a pipe, became the symbol of commerce. Lery says that the Brasilians smoke tobacco till they became intoxicated. We shall observe that these people have discovered the most cephalic plant of the whole vegetable kingdom, and that its use is the most universally diffused of all those that exist on the surface of the globe, the vine and corn not excepted. I have seen it cultivated in Finland, beyond Wiborg, in the sixtieth degree of north latitude. The habit of using it is so powerful, that a person who is accustomed to it, will rather dispense for a day with bread than with his tobacco. This plant is, however, a real poison; it affects in time the olfactory nerves, and sometimes the sight. But man is always willing to impair his physical constitution, provided he can strengthen his intellectual faculties.

OF SEEING.

All that we have said in explaining certain general laws of Nature, of harmonies, of consonances, of contrasts,

and of oppositions, refers principally to the sense of seeing. I say nothing of adaptations, for they belong to the sentiment of reason, and are entirely distinct from matter. The other relations indeed, are founded on the reason of Nature, which enlivens us by means of colors and forms generative and generated, and renders us melancholy by those which announce decomposition and destruction. But without entering upon this vast and inexhaustible subject, I shall here treat only of certain optical effects, which involuntarily excite within us the sentiment of some of the attributes of the Deity.

One of the most ordinary causes of the pleasure we experience from the sight of a great tree, proceeds from the sentiment of infinity, produced within us by its pyramidal form. The progressive decrease of its different stages of branches, and the various tints of verdure, which are always lighter at the extremities of the tree than in the rest of its foliage, give it an apparent elevation which has no bounds. We experience the same sensations from the horizontal plane of landscapes, in which we frequently perceive several ranges of hills rising one behind the other, till the most remote are blended with the sky. Nature produces the same effects in extensive plains, by means of the vapors arising from the shores of the lakes, or from the channels of the rivers and streams that traverse them; their contours are multiplied in proportion to the extent of the plains, as I have frequently remarked. These vapors appear on different planes: sometimes they stand still, like curtains over the skirts of the forests; sometimes they rise in columns along the streams that meander through the meadows: sometimes they are grey, at others they are illumined and penetrated by the rays of the sun. Under all these aspects they exhibit to us, if I may venture to use the expression, different perspectives of infinity within infinity.

I say nothing of the delightful spectacle which the heavens sometimes display in the disposition of the clouds

I am not aware that any philosopher ever suspected that their beauties were governed by laws. So much is certain, that there is not a single animal which lives in the light, but what is sensible to their effects. I have, in another place, said something concerning their characters of loveliness or of terror, which are the same as those of the pleasing or dangerous animals and vegetables, conformably to those of the days and of the seasons which they announce. The laws which I have sketched from them will furnish delightful subjects of meditation to those who are disposed to study them in any other manner than with the mechanical medium of our barometers and thermometers. Those instruments are fit only to regulate the atmosphere of our apartments; they too often conceal from us the action of Nature; they announce, in general, the same temperatures on the days which cause the birds to sing, and on those which reduce them to silence. The harmonies of the heavens can be felt only by the heart of man. All nations, struck with their ineffable language, raise their eyes and their hands toward heaven, in the involuntary movements of joy or grief. Reason, however, tells them that the Deity is every where. Why does no one among them stretch out their arms towards the earth or the horizon to invoke it? Whence comes this sentiment which whispers to them that God is in heaven? Is it because heaven is the seat of light? Is it because light itself, which enables us to perceive every object, being unlike our terrestrial substances, incapable of being divided, corrupted, destroyed, and confined, seems to exhibit something celestial in its substance?

It is to the sentiment of infinity, produced by the aspect of the heavens, that we must ascribe the partiality of all nations for building temples on the summits of mountains, and the invincible propensity which the Jews felt, in common with other nations, to worship on high places. There is not a mountain in the islands of the Archipelago but what has its church, nor a hill in China but what has its

pagoda. If, as certain philosophers pretend, we were never to judge of the nature of things but by the mechanical results of comparisons between them and ourselves, the elevation of mountains would have the effect of humbling our insignificance. But the fact is, that those vast objects, rearing their heads towards heaven, elevate our souls by the sentiment of infinity, and that by removing us from the earth, they raise us towards more permanent beauties.

The works of Nature display, at one and the same time, several sorts of infinity; thus, for example, a large tree, whose trunk is hollowed and covered with moss, excites the sentiment of infinity in time, as well as that of infinity in elevation. It exhibits a monument of ages in which we did not exist. If to this be added infinity in extent, as when we perceive through its sombre branches objects prodigiously remote, our respect is increased. Add still farther the different ridges of its mass, which contrast with the depth of the vallies and the level of the plains, its venerable half lights, which form oppositions to each other, and sport with the azure of the heavens; and the sentiment of our own wretchedness, which it relieves by the ideas of protection arising from the thickness of its trunk, immoveable as a rock, and from its august summit agitated by the winds, the majestic murmurs of which seem to sympathize with our woes. A tree with all these harmonies inspires us with a certain inexpressible religious veneration. Accordingly Pliny asserts that trees were the first temples of the Gods.

The sublime impression which they produce is still more profound, when they recal to our minds some sentiment of virtue, as the recollection of the great men by whom they were planted, or of those whose tombs they overshadow. Such were the oaks of Iulus at Troy. It is in consequence of this sentiment that the mountains of Greece and Italy appear more venerable to us than those of the rest of Europe, though they are not of higher antiquity, because their monuments, ruined as they are, remind us of the vir-

tues of the persons who inhabited them. But that subject does not belong to this article.

In general the different sensations of infinity are increased by the contrasts of the physical objects which produce them. Our painters are not sufficiently attentive to such as they introduce into the fore-grounds of their pictures. They would give much more effect to the back ground of their scenery, were they to oppose the front to it, not only in colors and in forms, as they sometimes do, but likewise in Nature. Thus, for example, if the artist were desirous of giving a high degree of interest to a lovely and smiling landscape, he should exhibit it through a large triumphal arch, crumbling into ruin beneath the hand of time. On the contrary, a town filled with Etruscan or Egyptian monuments, appears still more ancient when viewed from beneath a bower of verdure or of flowers. We ought to imitate Nature, who never produces the most lively plants in all their beauty, such as mosses, violets, roses, but at the foot of wild and rugged rocks.

Not but that consonances likewise produce grand effects, especially when they approximate objects which are distinct from each other. It is thus, for example, that the cupola of the college of the Four Nations presents a magnificent point of view when beheld from the middle of the court of the Louvre, through the arcade of that palace, which is opposite; for it is then seen quite entire, with a portion of the sky under the key of the vault, as if it were a part of the Louvre. But even in this consonance, which gives such an extent to our optics, there is also a contrast of the concave form of the arcade with the convex figure of the cupola.

The great art of moving is to oppose sensual and intellectual objects. The soul then takes a daring flight. It passes from the visible to the invisible, and delights to rove through the boundless fields of sentiment and of intelligence. Among certain tribes of Tartary, when a great man dies, his groom, after the interment, leads out the

horse which his master used to ride, by the bridle, lays his clothes upon the animal's back, and walks him in silence before the assembly, whom this spectacle melts into tears.

When the circumstances understood are numerous and are connected with some virtuous affection, the emotions of the soul are heightened. Thus when in the Æneid, Iulus promises presents to Nisus and Euryalus, who are going in quest of his father to Palanteum, he says to Nisus:

> Bina dabo argento perfecta atque aspera signis
> Pocula, devictâ genitor quæ cepit Arisbâ;
> Et tripodes geminos, auri duo magna talenta,
> Cratera antiquum quem dat Sidonia Dido.*
>
> Lib. ix. ver. 263.

"I will give you two goblets with figures in *alto relievo* of exquisite workmanship. My father took them at the capture of Arisba. To these I will add two tripods; two great talents of gold, and an antique bowl, the gift of Sidonian Dido."

He promises the two youths, united in the bonds of the tenderest friendship, double presents, two cups, two tripods to serve as stands for them after the manner of the ancients, two talents of gold to replenish them with wine, but only one bowl, that they might drink together. And then what a bowl! he boasts neither of the materials nor of the workmanship, as in the case of the other presents; he attaches to it moral qualities much more precious in the eyes of friends. It is antique; it was not the prize of violence, but the gift of affection. Iulus had undoubtedly received

> * Your common gift shall two large goblets be,
> Of silver, wrought with curious imagery;
> And high emboss'd, which when old Priam reign'd,
> My conquering sire at sack'd Arisba gain'd:
> And more, two tripods cast in antique mould,
> With two great talents of the finest gold;
> Besides a costly bowl engrav'd with art,
> Which Dido gave when first she gave her heart.
>
> DRYDEN.

it from Dido, when she fondly hoped to become the wife of Æneas.

In all the scenes of passion, where it is intended to produce powerful emotions, the more the principal object is circumscribed, the more the intellectual sentiment resulting from it is extended. There are several other reasons, the most important of which is, that accessory contrasts, as littleness and greatness, weakness and strength, finite and infinite conspire to heighten the contrast of the subject. When Le Poussin composed his picture of the universal deluge, he confined it to the representation of a single family. You see an old man on a horse which is drowning, and in a boat, a man, probably his son, is handing to his wife, who has scrambled upon a rock, a little child, dressed in a red petticoat, who, on its part, is making every effort with its little feet to get upon the rock. The back-ground of the scene is horribly dismal. The herbage and the trees are dripping with water; the earth itself is drenched, as may be seen by the long serpent which is in such haste to leave its hole. The torrents pour down on every side; the sun himself appears in the heavens like an eye thrust out of its socket. But the greatest interest is excited by the the feeblest object; a father and a mother, on the point of perishing themselves, are wholly engrossed with the preservation of their child. Every other sentiment is extinguished on the earth, and maternal tenderness still survives. The human race is destroyed on account of its crimes, and innocence is about to be involved in its punishment. These unbounded torrents, this inundated earth, this extinguished sun, these desolated solitudes, this forlorn family, all the effects of this universal ruin of the world are concentrated upon an infant. There is not however any one who, on on viewing the little group of persons around it, would not exclaim: "There is the general Deluge!" Such is the nature of the soul; so far from being material, it seizes nothing but consonances. The fewer physical objects you display to it, the more intellectual sentiments you excite.

OF HEARING.

Plato calls hearing and sight the senses of the soul. I believe he particularly applies that term to them, because vision is affected by the light, which is not, properly speaking, a substance; and hearing, by the modulations of the air, which are not of themselves bodies. Besides, these two senses convey to us only the sentiment of conformities and harmonies, without involving us in matter, like smelling, which is affected solely by the emanations of bodies; tasting by their fluidity; and the touch by their solidity, by their softness, by their heat, and other physical qualities. Though hearing and seeing be the direct senses of the soul, it must not, however, be concluded that a man born deaf and blind would be an idiot, as some have asserted. The soul sees and hears by means of all the senses. This is demonstrated by the blind princes of Persia, whose fingers possessed so much intelligence, according to the report of Chardin, that they traced and calculated all the figures of geometry on tables. Such are likewise the deaf and dumb, whom the Abbé de l'Epée taught to converse

I have no occasion to expatiate on the intellectual relations of hearing. This sense is the immediate organ of intelligence; it is this that receives the accents of speech, a faculty conferred only on man, and which, by means of its infinite modulations, expresses all the harmonies of Nature, and all the sentiments of the human heart. But there is another language, which appears to belong still more particularly to this first principle of ourselves, which we have denominated *sentiment*—I mean music. I shall not enlarge on the incomprehensible power it possesses of allaying and rousing the passions in a manner independent of reason, and of awaking sublime affections, disengaged from all intellectual perception: its effects are perfectly well known. I shall only observe, that it is so natural to man, that the

the first prayers addressed to the Deity, and the first laws among every nation were set to music. Man loses a taste for it only in civilized societies, whose very languages, in the course of time, lose their accents. The truth is, that a multitude of social relations there destroy the harmonies of Nature. In a state of refinement we reason much, and scarcely feel at all.

The author of Nature judged the harmony of sounds so necessary to man, that there is not a situation on the surface of the globe but what has its singing bird. The Canary-bird usually frequents, in the islands from which he derives his name, the gravelly ravines of the mountains. The goldfinch delights in sandy downs, the lark in the meadows, the nightingale in groves on the banks of streams; the bullfinch, whose note is so sweet, in the whitethorn: the thrush, the linnet, the green-finch, and all the other singing birds have their favorite situation. It is exceedingly remarkable that they every where possess the instinct of approaching the habitation of man. If there be but a single hut in a forest, all the singing birds in the vicinity are sure to settle round it. Nay, you even meet with none but in the neighborhood of inhabited places. I have travelled more than six hundred leagues through the forests of Russia, and I never saw any small birds but in the environs of villages. In making the tour of Russian Finland, with the generals of the corps of engineers in which I served, we sometimes proceeded twenty leagues a day, without seeing either villages or birds. But when we perceived sparrows fluttering in the trees, we concluded that we were not far distant from some inhabited place; and we were never deceived by this indication. I am the more willing to mention this circumstance, as it may perhaps be of service to persons who have lost their way in the woods. Garcilasso de la Vega relates that his father having been sent from Peru with a company of Spaniards, to explore the country beyond the Cordilleras, was near perishing of hunger among their

uninhabited vallies and morasses. He never would have found his way out of them, had he not perceived in the air a flock of parrots, which led him to suspect that there must be human habitations at no great distance. He directed his course toward that point of the compass to which the parrots had steered their flight, and after incredible fatigue, arrived among a small tribe of Indians, who cultivated fields of maize. We shall observe that Nature has not conferred melodious voices on sea or river birds, because they would have been drowned by the noise of the waters, and because the human ear could not have enjoyed it at the distance at which they live from the land. If there exist swans that sing, as some have asserted, their notes can have but little modulation, and must resemble the cries of the duck and goose. The voice of the wild swans, which recently came and settled at Chantilly, has only four or five notes. Aquatic birds have shrill cries, by means of which they can make themselves heard in the windy and tempestuous regions they inhabit, and which perfectly correspond with their turbulent situations, and their melancholy solitudes. The melodies of singing birds have similar relations to the sites which they occupy, and even to the distances at which they live from our habitations. The lark, that nestles among our corn, and delights to soar aloft into the air, has a voice that may be heard even when he is out of the reach of human sight. The swallow, grazing the walls of our houses as she flies, and alighting on our chimnies, has a gentle twittering which does not stun the ear, as would the strains of the birds of our groves; but the solitary nightingale makes himself heard at the distance of more than half a league. He mistrusts the vicinity of man, and yet he always takes his station within sight of his habitation, and within the reach of his ear. For this purpose he chuses situations which are the best adapted to reverberate the sound, that their echoes may give greater power to his voice. Having placed himself in his orchestra, he warbles an unknown drama, which has its exordium, its

exposition, its recitative, its catastrophe, intermingled sometimes with bursts of the most extravagant joy, sometimes with bitter and mournful recollections, which he expresses by lengthened sighs. He chants his song at the beginning of the season in which Nature is renewed, and seems to present to man a picture of the restless career which lies before him.

Every bird has a voice adapted to the seasons and situations in which it appears, and relative to the necessities of man. The shrill clarion of the cock calls him at the break of day to his labor. The gay song of the lark in the meadows invites the shepherdesses to the dance; the voracious thrush, which appears only in autumn, summons the rustic laborers to the vintage. Man alone, on his part, is attentive to the accents of the feathered tribes. Never did the stag, who sheds tears over his own misfortunes, heave a sigh at those of the plaintive Philomela. Never did the laborious ox, condemned after a life of painful services to the slaughter, turn his head toward her and say: "Solitary bird, behold how man rewards his servants!" Nature has diffused these distractions and these consonances of fortune over volatile beings, in order that our souls, susceptible of every woe, finding every where the means of extending them, might be every where enabled to alleviate their weight. She has rendered insensible bodies themselves capable of these communications. Amid scenes which distress the eye, she frequently presents other scenes which delight the ear, and soothe the mind with pleasing recollections. It is thus that, in the bosom of forests, she transports us to the brink of waters by the rustling of the aspen and of the poplar. At other times she conveys to us, on the banks of streams, the noise of the sea and the manœuvres of shipping in the murmuring of the reeds, agitated by the winds. When she cannot seduce our reason by foreign imagery, she lulls it by the charm of sentiment; from the bosom of the forests, of the meads, and of the vallies she calls forth ineffable sounds, which excite in us agreeable reveries, and plunge us into profound slumbers.

OF TOUCHING.

I shall make but few reflections on the sense of touching; it is the most obtuse of all our senses, and yet it is, in some measure, the seal of our intelligence. To no purpose, is an object exposed in every possible way to our view, we think our knowledge of it imperfect as long as we are not permitted to touch it. This instinct probably proceeds from our weakness. which in these approximations seeks points of protection. Be this as it may, this sense, obscure as it is, may be made the channel of communicating intelligence, as is demonstrated by the example, adduced by Chardin, of the blind Persians, who drew geometrical figures, and formed an accurate judgment of the goodness of a watch by handling the wheels. Wise Nature has placed the principal organs of this sense, which is diffused over the whole surface of our skin, in our feet and in our hands, which members are the best adapted for judging of the qualities of bodies. But, that they might not be exposed to the risk of losing their sensibility by frequent shocks, she has given them a great degree of pliancy, by dividing them into several fingers, and these fingers into several articulations; she has besides furnished them, at the point of contact, with elastic tips, which present a resistance in their callous and projecting parts, and at the same time possess exquisite sensibility in the retreating.

I am, however, astonished that Nature should have diffused the sense of touching over the whole surface of the human body, which is thus exposed to a variety of suffering, without deriving any important advantage from it. Man is the only animal that is obliged to clothe himself. There are, I admit, some insects, which make cases for themselves, as the moth; but they are produced in places where their clothing is, if I may so express myself, ready made. This necessity, which has been converted

into one of the most inexhaustible resources of our vanity, is, in my opinion, one of the strongest evidences of our wretchedness. Man is the only animal that is ashamed of appearing naked. This is a sentiment of which I cannot discover the reason in Nature, nor any similitude in the instinct of other animals. Besides, independently of all sense of shame, he is compelled by absolute necessity to clothe himself in every climate. Certain philosophers, wrapped up in comfortable cloaks, and who never stir beyond the limits of our cities, have figured to themselves a man in a state of Nature upon the earth, like a statue of bronze in the midst of one of our squares. But to say nothing of all the inconveniences which assail his wretched existence from without, as cold, heat, wind, rain, I shall confine myself to one, which, in our apartments, is only slightly felt, but which is insupportable to a naked man in the warm climates; I mean the flies. On this subject I shall quote the testimony of a man, whose skin must have been thoroughly seasoned; it is that of the freebooter Raveneau de Lussan, who crossed the isthmus of Panama in 1688, on his return from the South Sea. Speaking of the Indians of Cape Gracias a Dios, he says: "When they are inclined to sleep, they make a hole in the sand, and lie down in it; they then cover themselves with the sand they throw up, and this they do to defend themselves from the attacks of the musquitoes, with which the atmosphere is frequently quite filled. They are a kind of small gnats, which are felt before they are seen, and which have a sting so sharp and so venomous, that when they fix upon any one, it seems as if they had darted a shaft of fire into the flesh. These poor people are so dreadfully tormented with these terrible insects, that when there is no wind, they are rendered as it were leprous with them; and I can assert with truth, for I know it by personal experience, that the sufferings inflicted by their attacks are not slight; for they not only disturbed our rest in the night, but when we were obliged to go with our backs

naked for want of shirts, the persecutions of these animals drove us into transports of madness and despair."

It is, I presume, on account of the persecutions of the flies, which are very common and highly necessary in the marshy and humid places of hot countries, that Nature has placed on their shores not many hairy quadrupeds, but animals with scales, as the tatou, the armadillo, the tortoise, the lizard, the crocodile, the alligator, the land-crab, bernard the hermit, and other scaly reptiles, as serpents, on which the flies cannot make any impression. It is, perhaps, for the same reason that the hog and the wild boar, which love to frequent situations of this kind, have bristles long and stiff, which keep the winged insects at a distance.

With respect to man, Nature has employed none of these precautions. Truly, on contemplating the beauty of his forms and his complete nakedness, it is impossible for me not to admit the ancient tradition of our origin. Nature, in placing him on the earth, said: "Go, degraded being, animal destitute of clothing, intelligence without light; go, and provide for thy necessities. Thou shalt not be enabled to illumine thy blind reason, but by directing it incessantly towards heaven, nor to support thy wretched life but by the aid of creatures like thyself." Thus from the wretchedness of man sprung the two commandments of the law.

OF THE SENTIMENTS OF THE SOUL; AND FIRST OF THE AFFECTIONS OF THE MIND

My only motive for treating of the affections of the mind is to distinguish them from the sentiments of the soul: they differ essentially from each other. For example, the pleasure we receive from a comedy is different from that which a tragedy affords. The emotion which excites laughter is an affection of the mind, or of human reason that which melts us into tears is a sentiment of

the soul. Not that I would make of the mind and of the soul two powers of different natures, but to me it appears, as I have already observed, that one is to the other what the sight is to the body: mind is a faculty, and the soul is the principle of it; the soul is, if I may so express myself, the body of our intelligence. I therefore consider the mind as an intellectual vision to which may be referred the other faculties of the understanding; the imagination, which foresees things to come; the memory, which surveys those that are past; and the judgment, which discerns their consonances. The impression arising from these different views, sometimes excites within us a sentiment which is denominated evidence; and in that case this last belongs immediately to our soul, as we find by the delicious emotion which it suddenly produces; but having arrived at that point, it is no longer within the province of the mind, because when we begin to feel, we cease to reason; we no longer see, but we enjoy.

As our education and our manners direct us towards our personal interest, it is in consequence of this that the mind turns its whole attention to social conformities, and that our reason is, in fact, nothing more than the interest of our passions: but the soul, left to itself, is incessantly seeking the conformities of nature, and our sentiment is invariably the interest of mankind.

Accordingly I repeat, that the mind is the perception of the laws of society, and sentiment is the perception of the laws of Nature. Those who display to us the conformities of society, as comic writers, satirists, epigrammatists, and even the greatest part of moralists, are men of mind or understanding: such were the Abbé de Choisy, La Bruyère, St. Evremont, &c. Those who exhibit to us the conformities of Nature, as the tragic and the sentimental poets, the inventors of arts, the greatest philosophers, are men of genius: such were Shakspeare, Corneille, Racine, Newton, Marcus Aurelius, Montesquieu, La Fontaine, Fenelon, J. J. Rousseau. The former belong

to an age, a season, a nation, a society; the latter to posterity and to mankind.

We shall be still more sensible of the difference which exists between the mind and the soul on examining the nature of their affections. Whenever, for example, the perceptions of the mind are carried up to evidence, they afford us great pleasure, independently of all relations of private interest; because, as we have already observed, they excite a sentiment within us. But when we analyze our sentiments, and refer them to the examination of the mind, the sublime emotions they excited within us vanish: for, in that case, we never fail to refer them to some accommodation of society, of fortune, of system, and other personal interest of which our reason is composed. Thus, in the first instance, we convert our copper into gold, and in the second our gold into copper.

For the rest nothing can be more pernicious in the end than to study Nature with the mind; for though it may seize here and there some natural conformities, it cannot pursue the chain to any great length; besides, there is a much greater number which it does not discern, because it constantly refers every thing to itself, and to the limited, social, or scientific order in which it is circumscribed. Thus, for example, if it takes a survey of the celestial spheres, it will refer the formation of them to the labors of a glass-house; and if it admits the existence of a creating power, it will represent him as a mechanic, amusing himself with forming globes, merely for the pleasure of making them turn round. It will conclude, from its own disorder, that there is no order in Nature; from its own immorality that there is no morality. As it refers every thing to its own reason, and as it sees no reason for existing, when it shall be no longer upon the earth, it thence concludes that it will then cease to exist. Were it consistent, it would, in like manner, conclude that it does not now exist; for assuredly it cannot discover, either within itself or around it, any actual reason for its existence.

We are convinced of our existence by a power far superior to the mind, which is sentiment. We shall carry with us this natural instinct into our examination of the existence of the Deity, and of the immortality of the soul; on which our versatile reason has so frequently employed its powers on either side of the question. Though our insufficiency is too great to permit us to proceed far in this endless career, we hope that our perceptions, nay, even our very errors, may encourage men of genius to enter upon it. These sublime and eternal truths seem to us so deeply impressed upon the human heart, that they appear to be themselves the principles of sentiment, and to manifest themselves in our most ordinary affections, as in our most extravagant passions.

OF THE SENTIMENT OF INNOCENCE.

The sentiment of innocence exalts us towards the Deity, and impels us to the practice of virtue. The Greeks and the Romans employed children to sing at religious festivals, and to present their offerings at the altars, that, by the spectacle of their innocence, they might render the Gods favorable to their country. The sight of infancy calls men back to the sentiments of Nature. When Cato of Utica had formed the resolution to put a period to his life, his friends and servants took away his sword, and when he demanded it, with expressions of the most violent indignation, they sent it to him by the hands of a child; but the corruption of his contemporaries had stifled in his heart the sentiment which the presence of infancy ought to have excited.

Jesus Christ exhorts us to become like little children. They are called innocents, *non nocentes*, because they never injured any one. In spite, however, of the right of their tender age, and the authority of our religion, to what a barbarous education are they not consigned!

OF PITY.

The sentiment of innocence is the moving principle of pity; for this reason we are more powerfully affected by the sufferings of a child, than by those of an aged person. It is not, as certain philosophers have affirmed, because the child has fewer resources and fewer hopes; for he has, in fact, more than the old man, who is frequently infirm, and rapidly advancing towards his dissolution, whereas the infant is entering into life; but the latter has never offended; he is innocent. This sentiment extends to the very animals, which frequently inspire us with greater compassion than man, for this reason, that they are harmless. It was this that gave the good La Fontaine the idea contained in the following lines, when treating of the Deluge, in the fable of Baucis and Philemon:

> ——————Tout disparut sur l'heure.
> Les vieillards deploroient ces sévères destins:
> Les animaux perir! car encor les humains,
> Tous avoient du tomber sous les celestes armes.
> Baucis repandit en secret quelques larmes.

"Every thing instantly disappeared. The aged deplored the severity of fate. It was but just that man should perish beneath the stroke of divine indignation; but why should harmless brutes perish! At this thought tears stole down the cheeks of Baucis."

Thus the sentiment of innocence devolopes in the heart of man a divine character, which is that of generosity. It is not excited by the calamity itself, but by a moral quality, which it discovers in the sufferer. It is strengthened by the sight of innocence, and sometimes still more by that of repentance. Man alone, among all the animals, is susceptible of it, and this proceeds not from a secret reference to himself, as some enemies of mankind have asserted: for, if this were the case, on comparing a child

and an old man who are unfortunate, we ought to be much more affected by the sufferings of the old man, as we are ourselves removing from the miseries of childhood, and approaching those of old age; yet the contrary takes place, in consequence of the moral sentiment which I have alledged.

When an old man is virtuous, the moral sentiment of his misfortunes is heightened; which is an evident demonstration that the pity of man is not an animal affection. Accordingly, the sight of a Belisarius is deeply affecting. If you accompany it with the figure of a child, extending its little hand to receive the alms bestowed on the illustrious blind, the impression of pity is still more powerful. But I will state a sentimental case. Supposing you had met Belisarius soliciting charity on the one hand, and an orphan child, blind and wretched, on the other, and you had but a single crown, without the possibility of dividing it, to which of these two would you have given the money?

If you think that the important services rendered by Belisarius to his ungrateful country make the balance of sentiment too unequal, let the child be overwhelmed with the woes of Belisarius, and possess some of his virtues, as, for example, that of demanding charity for its parents, though they have put out its eyes.* I should imagine that you would no longer hesitate, if you gave way to your feelings alone; for if you reason, the case is entirely altered; the talents, the victories, and the celebrity of the Greek general will soon erase from the mind every impression of the misfortunes of an obscure child. Reason will bring you back to the political interest to the *I* human.

* The rector of a village in the vicinity of Paris, near Dravet, was in his childhood treated by his parents with not less cruelty. He was castrated by his father, who was a surgeon, and notwithstanding his barbarity, he supported him in his old age. He was intended for a singer in the chapel royal by his father, who adopted this expedient after the example of the Italians, among whom this horribly barbarous custom prevails. I believe that both the father and son are still living.

The sentiment of innocence is an emanation of the Deity t encircles the unfortunate with a celestial irradiation, which is reflected upon the human heart, and there kindles generosity, another flame of divine origin. It is this alone that renders us sensible to the misfortunes of virtue, by exhibiting it as incapable of injuring, for otherwise we should consider it as perfectly self-sufficient. It would then excite our admiration rather than our pity.

OF THE LOVE OF COUNTRY.

Sentiment is likewise the source of the love of country; because it recals to the mind the gentle and pure affections of the early ages. It increases with extent, and acquires strength with the lapse of years, as a sentiment of nature celestial and immortal. The Swiss have an ancient and extremely simple musical air, called the *Rans des Vaches*. This air produces such a powerful effect, that it was found necessary to forbid it to be played before the soldiers of that nation in Holland and in France, because it made them all desert one after another. I imagine that this *Rans des Vaches* imitates the lowing herds, the reverberation of echoes, and other local correspondencies, which cause the blood to boil in the veins of these poor soldiers, as it reminds them of the vallies, the lakes, the mountains of their native land,* and at the same time revives the recollection of the companions of their youth, of their early attachments, and of their virtuous forefathers.

* I have heard that Poutaveri, the native of Otaheite, who was brought some years ago to Paris, perceiving in the Garden of Plants a kind of mulberry-tree, the bark of which is used in that island for making cloth, burst into tears, and embracing it, exclaimed—"O tree of my country!" I should wish it to be ascertained by experiment whether, upon offering to a foreign bird, as for instance, to a parrot, a fruit of his native country, which he had not seen for a considerable time, he would manifest any extraordinary emotion at the sight of it. Though physical sensations powerfully attach us to country, yet moral sentiments alone can give them permanency. Time, which weakens the first, only contributes to strengthen the second. It is from this cause that our veneration for a monument is always proportioned to its antiquity and its distance, and conformably to this principle Tacitus has said: "*Major e longinquo reverentia.*"

The love of country seems to be powerful in proportion to its innocence and its wretchedness. Hence it is that savage tribes love their country more than civilized nations, and those who inhabit wild and rugged regions, as the natives of mountains, more than those who live in fertile plains and in genial climates. Never has the court of Russia yet been able to induce a single Samojede to leave the shores of the Frozen Ocean, and to settle at Petersburg. During the past century several Greenlanders were brought to the court of Copenhagen, where they were loaded with favors, but soon died of chagrin. Several of them were drowned in attempting to return in a boat to their native land. They beheld with the utmost indifference all the magnificence of Denmark; but there was one among them who burst into tears, whenever he saw a woman with a child in her arms. It was conjectured that this unhappy man was a father. It is undoubtedly the gentleness of domestic education which so strongly attaches these people to the scenes of their native land. It was this that inspired the Greeks and the Romans with such courage in the defence of their country. The sentiment of innocence heightens this love, because it renders all the affections of early life pure, sacred, and unalterable. Virgil was well acquainted with the effect of this sentiment, when he put into the mouth of Nisus, who was endeavoring to dissuade Euryalus from exposing himself to the dangers of a nocturnal expedition, these affecting words:

"Te supreme velim: tua vitâ dignior ætas."

"Thy bloomy youth deserves a longer date;
"Live thou——————"

DRYDEN

But among nations in which childhood is rendered unhappy, and is corrupted by the vexations, the ferocity, and inconsistency of education, love of country is no more to be found than innocence. This is one of the causes why

so many Europeans are dispersed over the world, and why there are so few ancient monuments in Europe; because each generation never fails to destroy the monuments of that which preceded it. Hence it is that our books, our fashions, our customs, our ceremonies, and our languages so soon become antiquated, and are totally different in each succeeding century; whereas all these things have remained without variation among the sedentary Asiatic nations for a long series of ages; because children brought up in Asia with great tenderness, in the bosom of their families, conceive an inviolable attachment to the institutions of their ancestors, from the recollection of their felicity and of their innocence.

OF THE SENTIMENT OF ADMIRATION.

The sentiment of admiration conveys us immediately into the bosom of the Deity. If it is excited in us by some object of pleasure, we throw ourselves into it, as into its source; if by terror, we flee to it as a refuge. In either case, the cry of admiration is—"O my God!" This some have asserted, to be the effect of our education, in which God is frequently the theme of our instructors; but our fathers, a king, a patron, or some celebrated scholar are still more frequently the subject of their conversation. Why is it that when we stand in need of support in these unexpected shocks, we never exclaim, "O my king!"—or, if the circumstance relates to the sciences, "O Newton!"

So much is certain, that if we are sometimes reminded of God in our education, we soon lose every idea of him in the ordinary course of the affairs of the world. Why then have we recourse to him on extraordinary occasions? This natural sentiment is common to all nations, among many of which children receive no instruction whatever in theology. I have observed it in the Negroes of the Coast of Guinea, of Madagascar, of Caffraria, of Mozambique; in Tartars and in Malabars; in a word, in natives

of every part of the globe. I have not seen a single individual but what, in extraordinary emotions of surprise or of admiration, uttered in his native language the same exclamations as we, at the same ime raising his hands and his eyes to heaven.

OF THE MARVELLOUS.

The sentiment of admiration is the source of the instinct of the marvellous, which men in every age possessed.

We are continually in quest of this, and apply it principally at our entrance into life, and our departure out of it: for this reason the cradles and the tombs of so many men have been enveloped in fables. It is the inexhaustible source of our curiosity; it expands in early infancy, and long continues to accompany innocence. Whence can children derive the love of the marvellous? They must have fairy-tales, and grown-up people cannot dispense with epic poems and operas. It is the marvellous that constitutes one of the most powerful charms of the antique statues of Greece and Rome, which represent heroes or gods, and contribute more than is imagined to inspire us with a love of the ancient history of those countries. This is one of the natural reasons which may be adduced in answer to the president Henault, who expresses his astonishment that men should have a greater partiality for ancient than for modern history, and, above all, for that of their native country. It proceeds from this, that, independent of the patriotic sentiments which, at least, serve as pretexts for the intrigues of the great among the Greeks and the Romans, and to which those of our own country were such utter strangers that they frequently convulsed their native land for the interest of their house, and sometimes for the honor of precedence or of a seat: there is a certain degree of the marvellous in the religion of the ancients, which consoles and exalts the human mind, whereas that of the religion of the Gauls terrifies and degrades it.

Th gods of the Greeks and of the Romans were patriots like their great men. Minerva gave them the olive, Neptune the horse. These deities protected the towns and their inhabitants. But those of the Gauls were tyrants, like their barons, and confined their protection to the Druids. They required human sacrifices. In a word, this religion was so barbarous, that, according to the testimony of Suetonius and Pliny, it was abolished by two Roman emperors successively. I say nothing concerning the modern interests of our country; but I am well assured that the relations of our policy will never supersede in the human heart those of the Deity.

I shall observe that, as admiration is an involuntary movement of the soul towards the Deity, and is consequently sublime, certain modern historians have endea voured to multiply beauties of this kind in their works, by crowding them with surprizing incidents; Nature, however but rarely employs them in her productions, because man is not capable of enduring too frequently similar shocks She displays to us by degrees the light of the sun, the expansion of the flowers, the formation of the fruits. She precedes our enjoyments by a long series of harmonies, she treats us as men, that is as machines, feeble and easily disordered; she veils the Deity from us, that we may be enabled to endure his approach.

PLEASURE OF MYSTERY.

This is the reason why mystery has so many charms. It is not pictures, that are illumined by the most brilliant lights, avenues laid out in right lines, full-blown roses, and women of perfect beauty that please us the most. No; the shady valley, the path winding through the forest, the scarcely half-opened flower, the bashful shepherdess excite within our bosoms the sweetest and most durable emotions. Love and respect for objects are heightened by their mysteries. Sometimes it is that of antiquity which render

so many monuments venerable in our eyes; sometimes it is that of distance, which confers so many charms on the objects of the horizon; and sometimes it is that of names. Hence it is that the sciences which have preserved Greek names, that frequently signify very common things, command greater respect than such as employ only modern terms, though these last are often more ingenious and more useful. Hence it is that, for example, ship-building and navigation are held in much less estimation by modern scholars than many other physical sciences, which are, perhaps, extremely frivolous, but are dignified with Greek names. Thus admiration is not a relation of the mind, or a perception of our reason, but a sentiment of the soul, which arises within us by a certain ineffable instinct of the Deity, at the sight of extraordinary things, and in consequence of that very mysteriousness in which they are enveloped. This is so certain that it is destroyed by the very knowledge which enlightens us. If I shew a savage an air-tube, which projects a stream of inflamed spirit of wine, he is transported with admiration; he is ready to adore my machine, and takes me for the god of fire, as long as he is ignorant of its mechanism, but when this is explained to him, he ceases to admire me, and looks upon me as a mere quack.*

PLEASURES OF IGNORANCE.

It is in consequence of these ineffable sentiments, and of these universal instincts of the Deity, that ignorance has become the inexhaustible source of our pleasures. We must be careful not to confound ignorance and error, after

* Hence it is that we admire nothing but what is rare. If one of those parhelions, so common at Spitzbergen, were to appear on the horizon of Paris, every one would run out into the streets to admire it. It is, however, nothing more than a reflection of the sun's disk in the clouds, and no one would stand still to admire the sun himself, because he is too common. Mystery constitutes one of the charms of religion. Those who desire a mathematical demonstration of this are not acquainted either with the laws of Nature, or with the wants of the human heart.

the example of our moralists. Ignorance is the work of Nature, and is frequently a favor conferred upon man; error is often the fruit of our pretended sciences, and is always an evil. Notwithstanding the assertions of our political writers, who extol our present illumination, and oppose to it the barbarism of past ages, it was not the ignorant who then laid waste Europe with fire and sword for disputed points of religion. Ignorant people would have remained quiet. They were men blinded by error, who probably boasted, like us, of their intelligence, and into the mind of each of whom had been instilled that error of childhood—Be the first.

How many evils ignorance conceals from us, which we are one day destined to meet in life, without being able to avoid them!—the inconstancy of friends, the vicissitudes of fortune, and the hour of death, which terrifies so many. The knowledge of these evils would deprive us of the enjoyment of life. How many blessings ignorance renders sublime! the illusions of friendship and of love, the prospects of hope, and the very treasures which are disclosed to us by the sciences. These only charm us when we are entering upon the study of them, when the mind applies to it enveloped in ignorance. It is the point of contact of day and night that produces the light most favorable to the eye; it is this harmonic point that excites our admiration, when our understandings become enlightened, but exists only for a moment. It is dissipated with our ignorance. The elements of geometry have powerful charms for youth, but never for the aged, unless it be certain celebrated geometricians, who have proceeded from discovery to discovery. It is only sciences and passions, subject to innumerable doubts and hazards, that make enthusiasts of every age, such as chemistry, avarice, gambling, and love.

For one pleasure which science confers and destroys in conferring, ignorance bestows on us a thousand, which are much more agreeable. You demonstrate to me that the sun

is a fixed globe, whose attractions give to the planets half of their movements. Did those entertain an idea less sublime, who believed it to be guided by Apollo. They imagined at least that the looks of a God encompassed the earth, together with the beams of the orb of day. It was science that dismounted the chaste Diana from her nocturnal car; it was this that banished the Hamadryads from the ancient forests, and the gentle Naiads from the fountains. Ignorance had summoned the Gods to its joys, to its griefs, to its hymeneal rights, and to its tomb; Science behold in them nothing but the elements. She has abandoned man to man, and has cast him upon the earth as upon a desert. Ah yes! whatever may be the names she gives to the different kingdoms of Nature, undoubtedly celestial spirits superintend their combinations so ingenious, so varied, and so constant; and man, who has bestowed nothing on himself, is not the only being in the universe that is endowed with intelligence.

It is not to our knowledge that the Deity communicates the most profound sentiment of his attributes, but it is to our ignorance. Night gives us a much higher idea of infinity than all the brilliancy of day. In the day-time I see but one single sun; at night I behold thousands. Or are they suns, those stars of so many different colors? Those planets which revolve round the earth, have they inhabitants like ourselves? Whence comes the Georgium Sidus, recently discovered by the German Herschel? It was traversing the orbit ever since the creation, and yet was unknown to us. To what region are those lengthened comets repairing which travel through such immense spaces? What is that galaxy which divides the firmament? What are those two black spots, situated at the Antarctic pole, near the cross of the south? Can they be stars which diffuse darkness, according to the opinion of the ancients? Are there in the firmament places to which light never penetrates? The sun exhibits to me only a terrestrial infinity, and night discloses a celestial

one. O mystery! veil these enchanting views with thy sacred shades; permit not human science to apply to them its pitiful compasses! Let not virtue henceforward be reduced to the necessity of expecting its reward from the justice and the sensibility of a globe. Suffer it to think that the universe contains other destinies, besides those which constitute the misery of the earth!

Science shews us the limits of our reason; ignorance continually removes them farther from us. In my solitary excursions, I take good care not to enquire who is the owner of the mansion which I perceive at a distance. The history of its master frequently spoils that of the landscape. The reverse is the case with that of Nature; the more you study her works, the more reason you find to admire her. There is only one instance in which a knowledge of the works of men is pleasing to us, that is, when the monument we are surveying has been the abode of a virtuous man. What is that little turret which I see from Montmorency? It is that of Saint Gratien, where Catinat led the life of a sage, and where his ashes repose. My soul, circumscribed within a little village, flies to embrace the august age of Louis XIV. and then to soar to a sphere much more sublime than the world, that of virtue. When I cannot command prospects like this, the ignorance of the scenery is of greater advantage to me than an acquaintance with it. I have no occasion to know that a forest belongs to the abbey, or that duchy, in order to think it majestic. Its aged trees, its deep glades, its silent solitudes, are sufficient for me. When I no longer perceive man in it, I feel the Divinity.

If I give way ever so little to my feelings, there is no landscape but what I ennoble. Those vast meads are oceans; those foggy hills are islands, peering above the horizon; that town in the distant vale, is a city of Greece honored by the presence of Socrates and of Xenophon. Thanks to my ignorance, I can indulge the instinct of my soul. I plunge into infinity. I prolong the distance of

places by that of ages; and, to complete my illusion, I make the scene the abode of Virtue.

OF THE SENTIMENT OF MELANCHOLY.

Nature is so bounteous that she turns all her phenomena to our delight, and if we take notice, we shall find that the most common are likewise the most agreeable.

It gives me great pleasure, for example, when the rain descends in torrents, to see the aged, moss-covered walls dripping with water, and to hear the howling of the winds mingled with the pattering of the rain. These melancholy sounds lull me, at night, into a sweet and profound slumber. I am not the only individual sensible to these affections. Pliny mentions a Roman consul, who, when it rained, caused his bed to be placed beneath the thick foliage of a tree, that he might hear the pattering of the drops, and be soothed to sleep by their murmurs.

I know not to what physical law philosophers can refer the sensations of melancholy; for my part, I consider them as the most voluptuous affections of the soul. "Melancholy is dainty," said Michel Montaigne. The reason of this, in my opinion, is, because it gratifies at once the two powers of which we are composed, the body and the soul, the sense of our misery and that of our excellence.

Thus, for example, in bad weather, the sense of my wretchedness as a human creature is pacified when I know that it rains while I am under shelter, that it blows a tempest while I am snug in my bed. I enjoy at such times a negative felicity. To this are afterwards joined some of the attributes of the Deity, the perceptions of which convey such great pleasure to the soul, as of infinity in extent, arising from the distant howling of the wind. This sentiment may be heightened by reflecting on the laws of Nature, by representing to myself that this rain, which comes, I will suppose from the west, has been raised from the bosom of the ocean, and perhaps from the coasts of

America; that it comes to cleanse our large towns, to replenish the reservoirs of our springs, to render our rivers navigable; and, while the clouds which discharge it advance toward the east, to impart fecundity to the vegetables of Tartary, the seeds and substances which it carries into our rivers proceed westward to the sea, to supply with food the fishes of the Atlantic Ocean. These flights of my intelligence give to my soul an extension adapted to its nature, and appear to me the more agreeable in proportion to the tranquillity and security of my body, which, for its part is fond of repose.

If I am sad, and my soul is not inclined to roam so far I still enjoy a pleasure in indulging the melancholy which the weather excites. It then appears as if Nature, like a tender friend, adapted herself to my situation. Besides, she is always so interesting under whatever aspect she appears, that when it rains, I imagine I behold a beautiful woman weeping. Her beauty increases in proportion to her apparent affliction. In order to feel these sentiments, which I may venture to call voluptuous, we must not look forward to any projected excursions or visits, hunting-parties or journies, which then throw us into very ill humour, because we are disappointed. Still less must we cross our two powers, or bring them into collision with each other; that is, apply the sentiment of infinity to our misery, by thinking that the rain will never be over, and that of our misery to the phenomena of nature, by imagining that all the seasons are deranged, that the order of the elements is convulsed; nor give way to all the false reasonings in which a man who is wet through indulges. To enjoy bad weather the soul must travel, while the body reposes.

It is from the harmony of these two powers of which we are composed, that the most terrible revolutions of Nature frequently interest us much more than her most delightful scenes. The volcano of Naples has much greater attractions for travellers than the delicious gardens which border

its shores; the plains of Greece and Italy, covered with ruins, are more interesting than the highly cultivated fields of England; the picture of a tempest has more admirers than that of a calm; and the fall of a tower draws together a greater crowd of spectators than its erection.

PLEASURE OF RUINS.

I have for some time thought that there exists in man a certain love of destruction. If the populace can lay their hands upon a monument, they are sure to destroy it. I have seen at Dresden, in the grounds of Count de Bruhl, exquisite statues of women, which the Prussian soldiers mutilated for their amusement by firing at them, when they took that city. Most people of the lower orders are malicious; they take delight in destroying the reputation of all that is pre-eminent. But this malevolent instinct is not the production of Nature; it arises from the wretchedness of individuals, into whom ambition is instilled by education, and to whom it is forbidden by society, which throws them into a negative ambition. Being unable to raise any thing, they are not satisfied without destroying all they can lay their hands upon. The partiality for ruin in this case is not natural, and is simply the exercise of the power of the miserable. The uncultivated savage destroys only the monuments of his enemies; those of his own nation he preserves with the greatest care: and what demonstrates that in his nature he is much better than man in civilized society is this, that he never calumniates his own countrymen.

Be this as it may, the passive love of ruin is universally diffused over all mankind. Our voluptuaries construct artificial ruins in their gardens; the savages are fond of reclining in melancholy silence on the sea-shore, especially during storms, or in the vicinity of a cascade in the midst of rocks. Great destructions exhibit new, picturesque effects; it was a curiosity to produce these, added to

cruelty, which induced Nero to set fire to Rome, that he might enjoy the spectacle of the conflagration. Setting aside the sentiment of humanity, those long flames, which, in the midst of night, to use Virgil's expression, lick the skies, those volumes of red and black smoke, those showers of sparks of every color, those scarlet reflections in the streets, on the tops of the steeples, on the surface of the waters, and on the most distant hills, afford pleasure even in pictures and descriptions. This kind of affection, which is not connected with our physical wants, has led some philosophers to say, that the soul, being itself a movement, takes delight in all extraordinary emotions. This is the reason, say they, why such crowds of people run to see the the executions at la Grêve. In spectacles of this kind there is not, I admit, any picturesque effect. But they have advanced this axiom on grounds equally slight, with a multitude of others, which are to be found in their works. The true reason is, that the soul loves rest as much as motion. It is a harmony very easily deranged by powerful emotions; and if it were in its own nature a movement, I see no reason why it should be delighted with such as threaten it with destruction. The idea of Lucretius is, in my opinion, much more just, when he says, that propensities of this kind are produced by the sentiment of our security, which is heightened by the prospect of the danger from which we are secured. We delight, says he, to contemplate storms from the shore. It is undoubtedly from this disposition of the mind to recur to itself, that, in the winter evenings, people take delight in forming a family circle round a good fire, and in relating frightful stories of spectres, of people losing themselves at night in woods, and of highwaymen. It is likewise from the same sentiment that persons of the higher classes are fond of seeing tragedies, and of reading narratives of battles, of shipwrecks, and of the destruction of empires. The security of the peaceful tradesman is increased by the dangers of the warrior, the navigator, the statesman. This species o

of pleasure arises from the sentiment of our misery, which is, as we have already observed, one of the instincts of our melancholy. But we have within us a sentiment still more sublime, which causes us to take delight in ruins, independent of any picturesque effect, or any idea of security; I mean that of the Deity, which always mingles with our melancholy affections, and constitutes their most powerful charm. I shall proceed to describe some of its characters, according to the impressions which ruins of different kinds produce on my mind. This subject is equally new and rich; but time, and my inability prevent me from thoroughly investigating it. I shall, however, say a few words by the way, to exculpate and exalt human nature as much as lies in my power.

The human heart is naturally so strongly disposed to benevolence, that the spectacle of any ruin which conveys to the mind no other idea than that of human misery, inspires us with horror, whatever picturesque effect it may present. I was at Dresden in 1765, several years after its bombardment. That city, small indeed, but very handsome and of great trade, and the greater part of which is composed of regular streets, of little palaces, whose fronts were embellished externally with paintings, colonnades, balconies and sculpture, lay at that time more than half in ruins. The enemy had directed most of their bombs against the Lutheran church of St. Peter, which forms a rotunda, constructed with such solidity, that a great number of those bombs struck the cupola without doing it any injury, and rebounded on the adjacent buildings, which they set on fire, and partly destroyed. Things were still in the same state as at the end of the war, when I visited that city. They had only thrown up along some of the streets the stones which encumbered them, so as to form on each side long, black heaps. Parts of palaces were still standing, cleft from top to bottom. You might distinguish shattered staircases, painted ceilings, little cabinets papered with Chinese paper, fragments of looking-

glasses, of marble chimney-pieces, of smoky gilding. Of others nothing was left but the brick-work of the chimnies, which rose from among the ruins like lofty black and white pyramids. More than one third of the city was reduced to this deplorable condition. The inhabitants who were before so gay that they were called the French of Germany, were now seen sorrowfully passing to and fro. These ruins, which exhibited a thousand extraordinary accidents in their forms, their colors, and their groupes, plunged the spectator into profound melancholy; for they exhibited nothing but the traces of the indignation of a king, who had not vented his wrath upon the strong ramparts of a well-defended city, but on the agreeable habitations of an industrious people. I have even seen more than one Prussian affected at the spectacle. I myself though a stranger, had not the slightest feeling of the return of that security which is excited within us at the sight of a danger from which we are safe; but, on the contrary, a doleful voice resounding in my heart, repeated: "And if this were thy native city!"

This is not the case with ruins occasioned by time. These afford us pleasure by plunging us into infinity; they carry us back several centuries, and interest us in proportion to their antiquity. This is the reason why the ruins of Italy affect us more than our own, those of Greece more than those of Italy, and those of Egypt more than those of Greece. The first time I beheld an antique monument was near Orange. It was the triumphal arch erected by Marius after the defeat of the Cimbri. It is situated in the fields, at some distance from the town. It is an oblong mass, with three arches, nearly resembling the gate of St. Denis. When I was close to it, I could not satiate myself with the sight of it. "There," I exclaimed, "there is a work of the Romans," and my imagination carried me at once to Rome, and to the times of Marius. It would be difficult to describe all the sentiments which successively arose within my breast. In the

first place, this monument, though reared by the misery of mankind, like all the other triumphal arches in Europe, gave me no pain, because I recollected that the Cimbri had come like a banditti to invade Italy. I remarked that if this triumphal arch was a monument of the victories of the Romans over the Cimbri, it likewise displayed the power of time over the Romans. In the basso relievo of the frieze which represents a battle, I distinguished a standard, on which might be plainly perceived these letters: S. P. Q. R. *Senatus Populusque Romanus*; and another which had M. O. the signification of which I was unable to interpret. As for the soldiers, they were so much worn, that neither their arms nor their features were discernible. In other respects this monument was in good preservation, excepting one of the piers of an arcade, which a neighboring clergyman had demolished for the purpose of repairing his parsonage. This modern ruin produced other reflections on the excellence of the construction of the ancients in public monuments; for though this pier, which supported one side of the arcade had been removed, as I have already observed, the arch, which it sustained, remained suspended in the air without support, like one solid piece. It likewise occurred to me that the destructive rector was perhaps descended from the ancient Cimbri, as all the French are descendants of the ancient northern nations who invaded Italy. Thus, setting aside the demolition, which my respect for antiquity prevented me from approving, I was led to reflect on the vicissitudes of human affairs, which frequently place the victors in the situation of the vanquished, and the vanquished in that of the victors. I therefore figured to myself that as Marius had avenged the honor of the Romans, and destroyed the glory of the Cimbri, so one of the descendants of the Cimbri had, in his turn, destroyed that of Marius; and that the young females of the neighborhood probably repaired on holidays to dance in the shade of this triumphal arch, regardless by whom it was built, or by whom it was demolished.

The ruins in which Nature contends with human art inspire soft melancholy. She there demonstrates the vanity of our labors, and the perpetuity of her own. As she is always creating, even at the moment when she destroys, she plants in the clefts of our monuments the wall-flower, the chænopodium, grasses of different kinds, the wild cherry-tree, garlands of rubus, stripes of moss, and all the saxatile plants, which, by their flowers and their attitudes, form the most pleasing contrasts with the rocks. I used to stop with pleasure in the garden of the Luxembourg, at the end of the alley of the Carmelites, to contemplate a piece of architecture which had originally been intended for a fountain. On one side of the pediment which crowns it, is reclined an aged river-god, on whose face time has impressed wrinkles more venerable than those traced by the chisel of the sculptor: it has destroyed a thigh, and in its stead has planted a maple. Of the Naiad on the opposite side of the pediment nothing is left but the lower part of the body. Her head, her shoulders, and her arms have disappeared. Her hands still hold the urn from which, instead of fluviatic plants, shoot such as delight in the dryest situations, tufts of wall-flowers, dandelions, and long sheaves of saxatile grasses.

Beautiful architecture always produces beautiful ruins. The plans of art concur with those of Nature. I think nothing has a more imposing aspect than the antique and well-built castles erected by our ancestors on the summits of mountains, that they might discover their enemies while at a distance, from the parapet of which now issue lofty trees, whose tops are agitated by the winds. I have seen others whose battlements and loop-holes, formerly so murderous, were encircled with the flowers of the lilach, whose tints, of a soft yet brilliant violet, formed charming oppositions with the stones of the tower, cavernous and embrowned.

The interest of any ruin is increased when it is accompanied by some moral sentiment, for example, when these

demolished castles have been the retreats of robbers. Such was, in the district of Caux, an ancient building called the Castle of Lillebonne. The lofty exterior walls are broken at the angles, and are so covered with ivy that there are few places in which they can be discovered. From the midst of the courts, to which I think it would not be easy to penetrate, rise lofty, embattled turrets, from the summits of which issue large trees, that wave in the wind. Through the thick covering of ivy which clothes their sides, you here and there perceive Gothic windows, embrasures, and breaches, which afford a glimpse of the stair-cases, and resemble the entrances of caverns. You see no birds around this desolate habitation, excepting the buzzard, which hovers over it in silence; and if you sometimes hear the voice of any of the feathered tribes, it is that of some owl who there constructs her nest. This castle is situated on a rising ground, in the midst of a narrow valley, formed by mountains covered with forests. When I reflected, on beholding this mansion, that it was formerly inhabited by petty tyrants, who, before the royal authority was sufficiently established in the kingdom, sallied forth from it to commit depredations on their wretched vassals, and even on travellers, I could not help comparing it to the carcase and skeleton of some great beast of prey.

PLEASURE ARISING FROM TOMBS.

No monuments are more interesting than the tombs of men, and especially those of our own relations. It is remarkable that every people, in a state of nature, and even more civilized nations, have made the tombs of their ancestors the centre of their devotion, and an essential part of their religion. Those, however, must be excepted among whom the parents incur the hatred of their children by a gloomy and a cruel education, that is, the western and southern nations of Europe. In every other part of the world is this religious melancholy diffused. The tombs of

ancestors are, in China, one of the principal embellishments of the suburbs of the cities and of the hills in the country. They are the bonds that most powerfully attach savage nations to their native land.* When the Europeans have sometimes proposed to them to change their territory, they have replied: "Shall we say to the bones of our fathers, Rise, and accompany us to a strange land?" This objection they have always considered as unanswerable. The tombs have furnished Young and Gessner† with charming images for their poems. Our voluptuaries, who sometimes return to the sentiment of Nature, construct fictitious tombs in their pleasure grounds. In truth they are not those of their parents. Whence arises this sentiment of funeral melancholy in the midst of pleasures? Is it not because something still continues to exist after death? If a tomb excited no other idea than of what it contains, that is of a corpse, the sight of one would be revolting to their imaginations. Such is the fear which most of them entertain of death. To this physical idea then some moral sentiment must be united. The voluptuous melancholy

* The attachment of the Swiss to their native country is well known, and the respect paid by them to the tombs of their ancestors and relations is not less remarkable. The cemetery of Zug, the capital of the canton of the same name, is thus described:—"All the monuments in this place, consecrated to the dead, are of the same form and proportions. They are of a square and grey polished stone, three feet in height, bearing an epitaph, and beneath it a cross, gilt and richly ornamented. Every tomb is surrounded by some of the most fragrant, gay, and beautiful hortulan productions; and it may be correctly affirmed of this place, as it has been often figuratively and poetically expressed of many others, that the tears of maternal tenderness, of filial piety, and of disappointed love, create a perpetual spring. Each grave is separated from the others by little channels, that the flowers planted by the fond relatives and friends of the deceased may not be entangled with the adjacent vegetation. The cemetery is extensive, and is defended only by low palisades, above which is discovered all the magnificence of mountain scenery. The place is a public walk to the adjacent neighbourhood, invited by the natural and artificial embellishments, and by the gratification of the senses in this exuberant garden. Cursed be the profane hand which would break the feeblest tendril! But no such act of sacrilege is perpetrated. On festivals this favorite spot presents a view the most interesting, and seems to render the mansions of the deceased the most enviable abode of the living." T.

† The English reader will not fail to associate with these names that of the poetic Hervey, whose florid *Meditations* are so well known as to render any remark on them unnecessary. T.

which results from it arises, like all agreeable sensations, from the harmony of two opposite principles, the sentiment of our transient existence, and that of our immortality, which are combined at the sight of the last habitation of man. A tomb is a monument placed on the confines of the two worlds.

It exhibits to us, in the first place, the end of the vain inquietudes of life, and the image of eternal repose; it then excites within us the confused sentiment of a happy immortality, the probability of which is increased in proportion as the person whose memory it recals has been more virtuous. It is this that attracts our veneration. And this is so true that though there is no difference between the ashes of Socrates and of Nero, no one would have in his grotto those of the Roman emperor, were they even contained in an urn of silver, and there is not any who would not give those of the philosopher the most honorable place in his apartment, if they were enclosed in a vase of clay.

It is therefore, from this intellectual instinct for virtue that the tombs of great men inspire us with such profound veneration. It is from the same sentiment that those which contain objects that once were amiable, excite such painful regret; for, as we shall presently see, the attractions of love are produced only by the appearances of virtue. For this reason we are deeply affected at the sight of the little hillock which covers the remains of a lovely child, from the recollection of its innocence. Hence too it is that we behold with such emotion a tomb beneath which reposes a young female, in whose virtues centered the love and the hope of her family. To render these monuments interesting, there is no occasion for marble, for bronzes, for gilding. The more simple they are, the greater energy they impart to the sentiment of melancholy. They produce a stronger effect poor than rich, ancient than modern, with details of misfortune than with titles of honor, with the attributes of virtue than with those of power. It is in the country in particular that they make a profound impres-

sion. There a simple hillock frequently causes more tears to flow than the superb mausoleums in cathedrals.* It is there that grief assumes a character of sublimity, it rises with the aged yews of the cemeteries; it extends with the plains and the surrounding hills; it allies itself to all the effects of Nature, the dawn of Aurora, the murmuring of the winds, the setting of the sun, and the darkness of night. The most laborious employment, and the most humiliating destiny cannot erase this impression from the hearts of the most wretched. "For two years," says Father du Tertre, "our negro Dominic, after the death of his wife, never failed one single day, as soon as he had returned from his labor, to take the little boy and girl he had by her, and to carry them to the grave of the deceased, where he spent full half an hour in weeping, and his little children frequently followed his example." What a funeral oration for a wife and a mother! And yet she was only a poor slave.

From the aspect of ruins likewise results another sentiment, independent of all reflection; it is that of heroism. Great generals have more than once employed their sublime effect to exalt the courage of their soldiers. Alexander prevailed upon his troops, laden with the spoils of Persia, to burn their baggage, and no sooner had they set fire to it,

* Our artists make statues shed tears over the tombs of the great. It is but just that statues should be made to weep over those for whom men do not weep. I have been a spectator of many funerals of rich people, but very seldom observed any one shed a tear at them, unless occasionally some old servant, who was perhaps thrown out of employ. Some time ago, passing through a lonely street in the suburb of St. Marceau, I saw a coffin in the passage of a small house. Near this coffin knelt a female, who was engaged in prayer, and apparently overwhelmed with grief. This woman perceiving the priests at the end of the street coming to conduct the procession, rose and ran away, covering her eyes with both hands, and uttering lamentable cries. Some of the neighbours endeavoured to stop and to console her, but in vain. As she passed me I enquired whether it was the loss of a daughter or of her mother that so deeply afflicted her. "Alas, Sir!" she replied, bathed in tears, "it is the loss of a gentlewoman of whom I earned a livelihood. I used to chare for her." I enquired of the neighbours the name of this benevolent gentlewoman: she was the wife of a carpenter, in a small way of business. Ye rich, what use do you make of your wealth during your lives, since no one weeps at your death?

than they were ready to follow him to the end of the world William, duke of Normandy, on his landing in England, burned all his own ships, and his troops conquered that kingdom.* But there are no ruins which excite within us sentiments so powerful as those of Nature. They display to us this vast prison the earth, in which we are confined, as itself subject to destruction, and detach us all at once from our prejudices and our passions, as from a theatrical, transient, and frivolous representation. When Lisbon was destroyed by an earthquake, its inhabitants, escaping from their houses, embraced each other, great and small, friends and enemies, inquisitors and Jews, known and unknown, every one divided his clothes and his provisions with those who had none. I have witnessed something of the same kind in storms, on board of vessels on the point of destruction. The first effect of misfortune, says a celebrated writer, is to stretch the soul, and the second to break it. This is because the first movement of man in adversity is to raise himself towards the Deity, and the second is to descend again to physical wants. This last effect proceeds from reflection; but the moral and sublime sentiment almost always takes possession of the heart at the aspect of great destruction.

RUINS OF NATURE.

When alarms concerning the end of the world were propagated in Europe some centuries ago, great numbers

* The author has, in this passage, advanced a position which appears perfectly untenable. That the sight of ruins may be productive of heroism, I pretend not to deny: but surely M. de St. Pierre cannot seriously mean to assert that the spectacle of the conflagration of the Norman fleet, abstractedly from every other consideration, or, to use his own words, "independent of all reflection," inspired William's followers with such courage as enabled them to triumph over all opposition. Had they witnessed the destruction of an equal number of Harold's vessels, but still retained their own, the ruin would have been equally great; but it is more than probable that, in this case, they would not have fought with equal determination. It was consequently not the sight of the ruin, but the relation of the things destroyed to themselves which excited in the Macedonian and the Norman soldiers such heroic resolution. T.

of persons d vested themselves of all their property; and without doubt we should see the same effects produced at the present day, were such an opinion to obtain credit. But these total and sudden ruins are not to be apprehended in the infinitely wise plans of Nature: nothing is there destroyed but what is afterwards repaired.

The apparent ruins of the earth, as the rocks which project from its surface in so many places, have their utility. The rocks seem to us to be in ruins only because they are neither squared nor polished, like the stones of our monuments; but their anfractuosities are necessary to vegetables and the animals which are destined there to find nourishment and shelter. It is only for vegetative and sensitive beings that Nature has created the fossil kingdom, and wherever man raises masses unserviceable to those objects on the surface of the earth, she hastens to impress her chisel upon them, in order to employ them in the general harmony.

If we consider the end and the origin of her works, those of the most celebrated nations will appear extremely frivolous. Nations had no occasion to pile up such immense assemblages of stones to fill me with respect for their antiquity. A little pebble of our rivers is more ancient than the pyramids of Egypt: multitudes of cities have been destroyed since its creation. If I am desirous of adding some moral sentiment to the monuments of Nature, I can say to myself at the sight of a rock: 'Twas here perhaps reposed the virtuous Fenelon, while meditating his divine Telemachus; here perhaps it will one day be engraved that he effected a revolution in Europe, by teaching its kings that their glory consists in the happiness of their subjects, and the happiness of their subjects in the labors of agriculture: the eyes of posterity will once be attracted by the same stone on which mine are now fixed. It is thus that I embrace the past and the future at the sight of a perfectly rugged rock, and consecrating it to virtue by a simple inscription, I render it more venerable than if it were decorated with the five orders of architecture.

OF THE PLEASURE OF SOLITUDE.

It is likewise melancholy that renders solitude so attractive. Solitude flatters our animal instinct in presenting to us retreats so much the more tranquil as the storms of life have been violent; and it extends our divine instinct, by giving us prospects in which all the natural and moral beauties appear clothed with all the charms of sentiment. It is in consequence of these contrasts that no solitude is more pleasing than that which is in the vicinity of a great city and no popular festival more agreeable than when it is held near a solitude.

OF THE SENTIMENT OF LOVE.

If love were only a physical sensation, I should have nothing more to do than to introduce the reasonings and the actions of two lovers conformably to the physical laws of the circulation of the blood, the filtration of the chyle, and other humors of the body, in order to disgust the most profligate libertine: nay, even its principal act is accompanied with a sense of shame in the inhabitants of every country. There is no nation that publicly prostitutes itself; and though intelligent voyagers have asserted that this infamous custom was practised by the natives of the island of Otaheite, more attentive observers have since ascertained that it was confined, in that nation, to females of the very lowest class, and that the others maintained the appearances of modesty common to all mankind.

I cannot find in Nature any direct cause of modesty. If it be asserted that man is ashamed of the act of coition because it makes him resemble animals, that reason is not sufficient: for sleeping, eating, drinking, still more frequently produce a like resemblance, but he is ashamed of none of these. In truth, there is a cause of modesty in the physical act; but whence proceeds that which the moral

sentiment of it occasions? Not only this act, but even the recollection of it is concealed from the view. The female considers it as the testimony of her weakness, and opposes a long resistance to the solicitations of man. How happens it that Nature has placed in her heart this obstacle, which often triumphs over its most favorite propensities, and its most headstrong passions?

Independent of the particular causes of modesty, which are unknown to me, I think I can discover one in the two powers of which man is composed. The sense of love being, as it were, the centre at which meet all the physical sensations, as those of perfumes, of music, of agreeable colors and forms, of touching, of pleasing temperatures and tastes; from all these results a violent opposition to the other intellectual power, whence proceed the sentiments of the Deity and of immortality. Their contrast is so much the more complete in proportion as the act of the former is brutal and blind, and as the moral sentiment which usually accompanies love is more expanded and more sublime. Accordingly a lover, in order to subdue his mistress, never fails first to set the latter in action, and to employ his utmost efforts to amalgamate it with the other sensation. Thus modesty, in my opinion, is produced by the struggle between these two powers; for this reason children are naturally destitute of it, because the sense of love is not developed in them. Hence it is that youth have much modesty, because these two powers have attained in them to the highest degree of energy; and that most aged persons have none at all, because they have lost the sense of love from the decay of Nature, or its moral sentiment, from the corruption of society, or what is frequently the case, both together, from the concurrence of those two causes.

As Nature has rendered all the animal sensations subservient to this passion, which is destined to perpetuate human life, she has likewise combined in it all the sentiments of the soul; so that the tender passion presents to two lovers not only the sentiments which are connected

with our wants and the instinct of our misery, as those of protection, of succour, of confidence, of support, of repose, but likewise all the sublime instincts which exalt man above human nature. It was in this sense that Plato defined love an interposition of the gods in favor of youth.*

Whoever would make himself acquainted with human nature needs only to study the nature of love; he would then discover the origin of all the sentiments of which I have treated, and of a multitude of others, which I have neither the time nor the ability to unfold. We shall, however, remark that this natural affection develops in every being its principal character by imparting to it the utmost

* It was in consequence of the sublime influence of this passion that the Thebans formed a battalion of heroes, called the sacred band, who all perished together at the battle of Cheronæa. They were all found lying in ranks, their breasts pierced with pikes, and their faces turned towards the enemy. This spectacle drew tears even from the eyes of Philip, their conqueror. Lycurgus likewise availed himself of the power of love in the education of the Spartans, and converted it into one of the strong supports of the republic. But as the animal counterpoise to this celestial sentiment did not exist in the beloved object, it was productive, among the Greeks, of excesses, for which they have been justly reproached. Their legislators looked upon women as fit only for bearing children; they were not aware that by promoting love among men, they weakened that attachment which ought to unite the sexes, and that, to strengthen their political ties, they burst asunder those of Nature.

The republic of Lycurgus had some other natural defects, among the rest the slavery of the Helots. With the exception of these two points, I consider him as the most sublime genius that ever existed: besides, we ought to make great allowance for the obstacles of every kind which he encountered in the establishment of his laws.

In the harmonies of the different ages of human life, there are such pleasing relations of the weakness of children to the strength of their parents, of courage and of love among the youth of both sexes to the virtue and religion of the aged without passions, that I am astonished no one has yet presented at least a sketch of human society, according in this manner with all the necessities of life and the laws of Nature. There are some essays of this kind in Telemachus, among others in the account of the manners of the inhabitants of Bœotia, but they are only slightly touched upon. Such a society, thus united in all its parts, would, in my opinion, attain to the highest degree of social happiness at which human nature is capable of arriving on earth, and would remain immoveable amid the most violent political tempests. So far from fearing its neighbours, it would subdue them without arms, after the example of ancient China, by the mere spectacle of its felicity, and the influence of its virtues. I entertained the design of extending this idea, at the instigation of J. J. Rousseau, and of writing the history of a people of Greece, well known to poets, because they lived conformably to the dictates of Nature, and for that reason almost entirely unknown to our political writers; but time permitted me only to sketch the plan of it, and to complete no more than the first book

extension of which it is susceptible. Thus for example, it is in the season when every plant perpetuates itself by means of its flowers and its fruits, that it acquires all its perfection, and the characters by which it is invariably determined. It is in the season of love that the singing-birds redouble their melody, and that those which excel in their colors, are invested with all the beauty of their plumage, the tints of which they delight to display, by swelling out their ruffs, expanding their tails, or dropping their wings to the ground. It is then that the sturdy bull presents his head and menaces with his horns, that the nimble courser bounds over the plains, that the ferocious animals fill the forests with their bellowings, and that the tigress, exhaling the odor of carnage, makes the deserts of Africa resound with her hideous caterwauling, and appears in the eyes of her cruel lovers, irresistibly attractive.

It is likewise in the period of love that all the natural affections of the human heart are developed. It is then that innocence, candor, sincerity, modesty, generosity, heroism, sacred fidelity, piety, are expressed with ineffable graces in the attitude and in the features of two youthful lovers. Love assumes in their pure souls all the characters of religion and of virtue. They shun the tumultuous assemblies of cities, the corrupt paths of ambition, and seek in the most sequestered situations some rustic altar, where they may swear to each other everlasting attachment. The fountains, the woods, Aurora, the constellations of night, are alternately called to bear witness to their vows. Led astray by a religious intoxication, they frequently take each other for divinities. Every mistress is adored, every lover is an idolater. The grass upon which they tread, the air they breath, the shades beneath which they repose, appear to them to be hallowed by their presence. They behold in the universe no other felicity than that of living and dying together, or rather they entirely lose sight of death. Love transports them into boundless ages, and death appears to be nothing more than the me-

dium of uniting them for ever. But should any obstacle intervene to separate them, neither the hopes of fortune, nor the tender attentions of sympathizing friendship, are capable of affording consolation. After having reached the borders of heaven, they languish on earth; in their despair they immure themselves in cloisters, and pray to God during the remainder of their lives for that happiness of which they enjoyed but a momentary glimpse. Long after their separation, when chilling age has benumbed their senses, when they have been distracted by a thousand and a thousand other cares, which have so often caused them to forget that they were human creatures, their hearts still palpitate at the sight of the tomb which contains the object they loved. They had relinquished him in the world, they hope to meet him again in heaven. Unhappy Eloisa! what sublime sentiments the ashes of Abelard excited in thy soul!

These celestial emotions cannot possibly be the effects of an animal act. Love is not a slight convulsion as it is denominated by the divine Marcus Aurelius. It is from the charms of virtue and the sentiment of its godlike attributes, that it derives so much energy. Vice itself, in order to please, is obliged to borrow its features and its language. If actresses make so many conquests, it is because they seduce their admirers by the illusions of innocence, of benevolence, of magnanimity in the characters of shepherdesses, heroines, and goddesses, which they are in the habit of representing. Their so much vaunted graces are nothing more than the appearances of virtues. If, on the contrary, virtue is sometimes displeasing, the reason is, because it displays itself under the appearance of severity, ill-humor, ediousness, or some other failing by which we are disusted.

Accordingly beauty springs from virtue, and ugliness rom vice; and these characters are frequently impressed even on early infancy by education. Here it may be obected that there have been instances of men handsome and

vicious, and of others who have been homely and virtuous. Of this Socrates and Alcibiades were two celebrated examples in ancient times; but these very examples are in favor of my position. Socrates was unhappy and vicious at the age in which the physiognomy acquires its principal characters, from infancy till the age of seventeen years. He was born of poor parents, and his father was bent on compelling him to learn the profession of a sculptor, in spite of his repugnance. Nothing less than an oracle was capable of successfully opposing paternal tyranny. Socrates acknowledged, in conformity with the opinion of a physiognomist, that he was addicted to women and wine, the ordinary vices into which misery plunges men: he, at length, reformed himself, and nothing could be more beautiful than this philosopher when he was discoursing on the Deity. As to the happy Alcibiades, born in the lap of fortune, the lessons of Socrates, and the love of his parents and fellow-citizens, developed in him at one and the same time corporeal and mental beauty; but being afterwards debauched by associating with bad company, he had nothing left but the physiognomy of virtue. However seducing they may appear at first sight, you soon discover the ugliness of vice in the countenances of handsome persons who have become wicked. Notwithstanding their smile, you discern in them a something false and perfidious. This dissonance is perceptible even in the voice. Every thing about them is masked, like their faces. We shall farther observe, that all the forms of beings are expressive of intellectual sentiments, not only in the eyes of the man, who studies nature, but likewise in those of animals, whose instinct conveys to them at once a knowledge of those subjects, most of which are to us so obscure. Thus, for example, each animal has features which express its character. In the sparkling and restless eyes of the tiger we discover his fierceness and his perfidy. The gluttony of the hog is announced by the meanness of his attitude, and the inclination of his head towards the ground. All the animals are perfectly ac-

quainted with these characters, for the laws of Nature are universal. For instance, though to an inattentive man there may appear to be very little difference between the fox and a kind of dog which resembles him, a hen will never mistake one for the other. She will see the last close to her without alarm; but the sight of the other will fill her with terror. We shall farther remark that every animal expresses in its features some predominant passion, such as cruelty, voluptuousness, cunning, stupidity. But man alone, when not degraded by the vices of society, bears on his countenance the impression of a celestial origin. There is not a single trait of beauty but what may be referred to some virtue; this to innocence, that to candor, those to generosity, to modesty, to heroism. It is to their influence that man owes the respect and the confidence he receives from the animals in every country where their nature has not been altered by frequent persecutions. Whatever charms there may be in the harmony of the colors and of the forms of the human figure, we see no reason why its physical effect should have any influence over animals, were it not accompanied with the impression of some moral power. The fulness of forms, or the freshness of colors, would rather excite the appetite of ferocious beasts than their respect and their love. Lastly, as we distinguish the character of their passions, they likewise discover the character of ours, and are capable of judging with accuracy whether we are cruel or peaceable. The game which shuns the sanguinary huntsman, assembles around the peaceful shepherd.

It has been asserted that beauty is arbitrary among all nations; but we have elsewhere refuted this opinion by the evidence of fact. The mutilations of the Negroes, the figures cut in their skin, their flat noses, their compressed foreheads; the flat, long, round, and pointed heads of the Savages of North America; the pierced lips of the Brasilians; the large ears of the natives of Laos, in Asia, and of several tribes of Guiana, are the effects of superstition

or of a bad education. The ferocious animals themselves are struck with these deformities. All travellers unanimously relate that when the famished lions and tigers attack in the night some caravan, which, however, very rarely happens, the first victims of their fury are the animals, and then the Indians or Negroes. The European figure, with its simplicity, awes them much more than when deformed by the African or Asiatic characters.

When it has not been altered by the vices of society, its expression is sublime. A Neapolitan, named John Baptista Porta, had the ingenuity to discover resemblances between it and the figures of beasts. He wrote a book on this subject, the engravings in which represent human heads resembling those of the dog, the horse, the sheep, the hog, and the ox. His system is favorable to our modern opinions, and perfectly agrees with the alteration which the passions produce in the human figure. But I should like to know from what animal Pigal copied that charming Mercury I saw at Berlin, and after the passions of what beasts the Grecian sculptors executed the Jupiter Capitolinus, the Venus de Medici, and the Apollo of the Vatican. In what animals did they study those divine expressions?

I am convinced, as I have already observed, that there is not a single beautiful feature in any figure, but what may be referred to some moral sentiment relative to virtue and to the Deity. The features of ugliness, may, in like manner, be referred to some vicious affection, as jealousy, avarice, gluttony, anger. To prove to our philosophers how grossly they are mistaken when they assert that the passions are the only moving principles of human life, I wish some one would present to them the expressions of all the passions combined in one single head; for example, the wanton and immodest air of the courtezan, with the treacherous and ferocious air of ambition, and some traits of hatred and of envy, which are negative ambitions. A head uniting all these would be more hideous than Medusa's; it would resemble that of Nero.

Every passion has an animal character, as John Baptista Porta very justly observed. But every virtue likewise has its character; and a physiognomy is never more interesting than when we can discern in it a celestial affection struggling against a passion. I do not even know whether it be possible to express a virtue otherwise than by a triumph of this kind. It is this that makes modesty appear so amiable in the face of a youthful female, because it is the most violent conflict of animal passions with a sublime sentiment. The expression of sensibility likewise renders a countenance highly affecting, because the soul is there displayed in a state of suffering, and this spectacle excites in our bosoms a virtue, which is the sentiment of compassion. If the sensibility of this figure be active, that is, if it arise spontaneously at the sigh of the misery of another, it is still more striking, because it then becomes the divine expression of generosity.

It is my opinion that the most celebrated pictures and statues of antiquity are entirely indebted for their high reputation to the expression of this two-fold character, that is, to the harmony arising from the two opposite sentiments of passion and of virtue. So much is certain, that the master-pieces of the painting and sculpture of the ancients which are most extolled, all exhibited this kind of contrast. Of this we have abundance of examples in their statues, as in the Venus de Medici, and in the Dying Gladiator, who still retains in his fall the respect due to his glory, even at the moment when death snatches him away. Such too was the Cupid wielding the lightning after Alcibiades when a child, which Pliny ascribes to Praxiteles or to Scopas. A lovely child, launching from his little hands the lightnings of Jove, cannot fail to excite, at one and the same time, the sentiment of innocence and that of terror. To the character of the Deity was joined a human character equally attractive and formidable. I believe that the paintings of the ancients expressed still more strongly these harmonies of opposite sentiments.

Pliny, who has preserved the memory of the most celebrated, mentions, among others, a picture by Athenion of Maronea, representing the cautious and crafty Ulysses discovering Achilles in the disguise of a woman, by offering him some female ornaments, among which was a sword. The quick movement with which Achilles seizes the latter, must have formed a charming contrast with his assumed habit and the calm demeanor of a nymph; and another, not less interesting, must have been exhibited by Ulysses, with his cunning air, and the expression of joy restrained by his prudence, lest in discovering Achilles he should betray himself. Another, still more moving, by Aristides of Thebes, represented Biblis dying of love, the object o which is her own brother. Here might be distinguished the sentiment of virtue, which banished far from her the idea of a criminal passion, and that of fraternal tenderness which recalled love under the very appearance of virtue. These cruel consonances, despair at being betrayed by her own heart, the desire to die to hide her shame, the desire to live to enjoy the sight of the object beloved, her health impaired by such painful conflicts, all these must have produced, amid the languors of death and of life, the most interesting contrasts in the face of this unfortunate female. In another picture, by the same Aristides, was admired a mother wounded in the breast, at the siege of a town, and suckling her infant. Her countenance, says Pliny, seemed to express her apprehension lest it should suck her blood with her milk. Alexander valued it so highly that he caused it to be removed to Pella, the place of his birth. The victory of maternal love over bodily pain must have been a noble triumph. We have already seen that Le Poussin composed with that virtue the principal expression of his picture of the Deluge. Rubens has introduced it in an admirable manner into the face of his Medicis, in which you discover, at one and the same time, the pain and the joy of child-birth. He heightens still more the violence of the physical passion, by the care-

less attitude in which the queen is reclined in an arm-chair, and by her bare foot, which has come out of the slipper: and, on the other hand, he gives additional sublimity to the moral sentiment she feels, by the high destinies of her infant, who is presented to her by a god, and who is laid in a bower, amidst bunches of grapes and ears of corn, emblems of the felicity of her reign. Thus the great masters were not contented to oppose mechanically groupes and vacancies, lights and shades, children and aged persons, feet and hands; but they sought with the greatest assiduity those contrasts of the faculties of the soul which are expressed in the human countenance by traits ineffable, and which must constitute an everlasting charm in their pictures.

The productions of Le Sueur abound in these contrasts of sentiment, and he makes those of elementary nature harmonize with them so perfectly, as to produce the sweetest and most profound melancholy. But it was much more easy for his pencil to express, than it is for my pen to describe them. I shall mention only one example of this kind, taken from Poussin, whose compositions are truly admirable, but whose colors have been injured by time. It is in his picture of the Rape of the Sabines. While the Roman soldiers are bearing off in their arms the affrighted Sabine virgins, there is a Roman officer who appears desirous of securing a young and handsome female, who has taken refuge in the arms of her mother. He employs no violence towards her, and addresses the mother with all the ardor of love, and with profound respect. He seems to say to her: "She shall be happy with me. Let me obtain her by love, and not by fear. It is not so much my wish to deprive you of a daughter as to give you a son." It is thus that conforming in the habits of his figures to the simplicity of their age, which rendered them nearly alike in persons of every condition, he has not distinguished the officer from the soldier by his dress, but by his manners. He has seized, as he generally did, the

moral character of his subject, which produces a very different effect from that of costume. I could wish to have seen from the hand of the same man of genius, the same Sabines, as wives and mothers, between the Sabine and Roman armies, "running," as Plutarch says, "some one way, some another, with tears, cries, and shouts, rushing between the arms of the combatants, over the dead bodies extended upon the ground, so that they appeared to be mad, or possessed by some spirit; some carrying infants at the breast in their arms, others with their hair dishevelled, and all calling now the Sabines, now the Romans, by the tenderest names that exist among men."

The grandest effects of love are produced, as we have observed, by contrary sentiments which are blended together, as those of hatred frequently proceed from the collision of similar sentiments. For this reason no sentiment is more agreeable than to find a friend in the person we esteemed our enemy; nor any pain more severe than to discover an enemy in him whom we looked upon as our friend. It is these harmonic effects that often render a trifling service more grateful than a long series of good offices, and the offence of a moment more odious than the enmity of a whole life: because, in the first case, very opposite sentiments are united together, and in the second, sentiments intimately connected clash with each other. Hence likewise it is, that a single defect among the good qualities of a virtuous man frequently appears more disgusting than all the vices of a libertine in whom we discover a single virtue; because, by the effect of contrasts, these two qualities are the most prominent, and predominate over the others in the two characters. This must likewise be ascribed, in part, to the weakness of the human mind, which, invariably attaching itself to a single point in all its considerations, dwells on the most prominent quality for the purpose of forming its judgment. It is impossible to say into how many errors we fall, because we neglect to study the elementary principles of Nature.

They might undoubtedly be extended much farther; but I am satisfied with having said sufficient to demonstrate their existence, and to awaken in others the desire of making the application of them.

These harmonies acquire greater energy from the neighboring contrasts which set them off, from the consonances which repeat them, and from the other elementary law of which we have treated; but when some one of the moral sentiments of which we are here presenting a faint outline, is combined with them, a most enchanting effect is then produced. Thus, for example, a harmony becomes in some measure celestial when it contains a mystery which always presupposes something marvellous and divine. I one day experienced this very agreeable effect in turning over a collection of old prints, representing the history of Adonis. Venus had stolen the infant Adonis from Diana, and was educating him with Cupid. Diana was determined to recover him, because he was the son of one of her nymphs. One day, therefore, Venus having descended from her car, drawn by doves, was walking with the two children in a valley of Cythera. Diana, at the head of her armed nymphs, placed herself in ambush in a forest through which Venus had to pass. Venus perceived her enemy approaching, and being unable either to escape or to prevent the goddess from carrying off Adonis, she immediately clapped wings upon him, and presenting him with Cupid to Diana, told her to take whichever of the children she thought to belong to her. Both being equally beautiful, both of the same age, and both furnished with wings, the chaste goddess of the woods was deterred from chusing either the one or the other, lest she should take Cupid instead of Adonis.

There are many sentimental beauties in this fable. I one day related it to J. J. Rousseau, to whom it gave great pleasure. "Nothing pleases me so much," said he, "as an agreeable image which conveys a moral sentiment." We were walking in the plain of Neuilly near a

park, in which we saw a group of Love and Friendship, under the form of a young man and a young woman, of fifteen or sixteen years, kissing each other. Having looked at it, he said: "The artist has produced an obscene image from a charming idea. Nothing could have been more pleasing than if he had represented the two figures in their natural state; Friendship as a grown young woman caressing an infant Cupid." As we were upon this interesting subject, I repeated to him the conclusion of the moving fable of Philomela and Progne:

> Le desert est-il fait pour des talens si beaux?
> Venez faire aux cités eclater leurs merveilles.
> Aussi bien, en voyant les bois,
> Sans cesse il vous souvient que Thérée autrefois
> Parmi des demeures pareilles,
> Exerca sa fureur sur vos divins appas.
> Et c'est le souvenir d'un si cruel outrage
> Qui fait, reprit sa sœur, que je ne vous suis pas;
> En voyant les hommes helas!
> Il m'en souvient bien davantage.

"Why waste thy music in the desert air; come, charm the city with thy melodious strains. Besides, the very sight of the forest must incessantly remind thee that beneath their shades Tereus formerly violated thy divine charms.—It is the remembrance of that cruel outrage, replied her sister, which prevents me from bearing you company. The sight of man, alas! revives too powerfully the painful recollection."

"What a series of ideas!" cried he; "how affecting!" His voice was stifled, and tears rushed into his eyes. I could perceive that he was likewise moved by the secret analogy between the talents and the destiny of the bird and his own situation. It is obvious then, from the two allegorical subjects of Diana and Adonis, and of Love and Friendship, that there are actually within us two distinct powers, the harmonies of which exalt the soul, when the physical image conveys to it a moral sentiment, as in the first example, and on the contrary abase it, when a moral sentiment brings us back to a physical sensation, as in the instance of Love and Friendship.

The circumstances that are understood without being mentioned, likewise heighten moral expressions, because they are conformable to the expansive nature of the soul. They conduct it through a vast field of ideas. It is these that impart such a powerful effect to the fable of the Nightingale. Add to this also a multitude of oppositions, which I have not leisure to analyze.

The farther the physical image is removed from us, the greater is the extent of the moral sentiment; and the more the first is circumscribed, the more energetic is the sentiment. It is undoubtedly this that renders our affections so strong when we regret the death of a friend. Grief then conveys us from one world to another, from an object replete with charms to a tomb. Hence it is that this passage of Jeremiah contains a strain of such sublime melancholy: *Vox in Rama audita est, ploratus et ululatus multus: Rachel plorans filios suos et noluit consolari, quia non sunt*: A voice was heard in Ramah, lamentation and bitter weeping; Rachel weeping for her children, refused to be comforted because they are not.* All the consolations that this world can afford are dashed to pieces against this expression of maternal anguish, *non sunt*.

The single *jet d'eau* of St. Cloud pleases me more than all its cascades. If, however, the physical sentiment is not lost in infinity, it is capable of conveying sorrow thither when it reflects the same sentiment. I find in Plutarch a powerful effect of this progressive consonance. "Brutus," says he, "thinking his cause desperate, determined to leave Italy, and went on foot through the country of Lucania to the town of Elea, which is situated on the sea-shore. Here Portia being on the point of parting from him and returning to Rome, endeavored to conceal the anguish that rent her heart. But a picture discovered it, though before she had always manifested the utmost fortitude and constancy." The subject of this picture was

* Jeremiah, chap. xxxi. v. 15.

taken from Grecian story; it represented the parting of Andromache and Hector, who was going out of the city of Troy to battle, at the moment when he was delivering her infant into her arms; but her eyes were fixed only upon him. The conformity between this picture and her own feelings, made her burst into tears; she returned several times in the course of the day to gaze at it, and could never refrain from weeping. This being observed by Acilius, one of the friends of Brutus, he repeated the words of Andromache in Homer.

> Yet while my Hector still survives I see
> My father, mother, kindred, all in thee.—

Brutus replied with a smile: "But for my part I must not answer Portia in the words of Hector to Andromache, in the same passage of the poet:

> ——————hasten to thy tasks at home,
> There guide the spindle and direct the loom.

For though the natural weakness of her body prevents her from performing the same achievements of valor as we, yet in zeal for the welfare of our country she is inferior to none of us."

This picture was undoubtedly placed under the vestibule of some temple built on the sea-shore. Brutus was on the point of embarking privately and unattended. His wife, the daughter of Cato, had accompanied him, perhaps on foot. The moment of separation is at hand, and to sooth her anguish, she casts her eyes on this picture consecrated to the gods. She there beholds the parting of Hector and Andromache, who were destined never to meet again. Her soul is agitated, and to revive her fortitude she turns her eyes upon her husband. The comparison is completed; her courage forsakes her, the tears overflow, conjugal affection triumphs over the love of country:—two virtues in opposition. Add to these the characters of wild nature, which mingle so well with human grief; a pro-

found solitude, the columns and the cupola of the ancient temple, corroded by the air of the sea, and marbled with mosses, which gave them the appearance of green bronze; the setting sun gilding the roof; the murmurs of the sea breaking at a distance along the coast of Lucania, the towers of Elea perceptible in the bosom of a valley between two steep mountains, and the grief of Portia, which carries us back to the age of Andromache. What a picture suggested by a picture! Artists, could ye but produce it, Portia, in her turn, would call forth many a tear!

I could multiply to infinity the proofs of the two powers by which we are governed. I have said sufficient concerning a passion, the instinct of which is so blind, to shew that we are ruled and attracted in it by other laws than those of digestion. Our affections prove the immortality of the soul, since they expand in all circumstances in which they feel the attributes of the Deity, as in that of infinity, and dwell with pleasure upon nothing on earth but the charms of innocence and virtue.

OF SOME OTHER SENTIMENTS OF THE DEITY, AND AMONG OTHERS THAT OF VIRTUE.

Besides these, there are a great number of sentimental laws, which it has not here been in my power to discuss: such as those which produce presentiments, omens, dreams, the recurrence of fortunate and unfortunate events at the same periods, and others of the same kind. Their effects are attested among nations civilized as well as savage, by writers both sacred and profane, and by every person who is attentive to the laws of Nature. These communications of the soul with an invisible order of things, are rejected by the learned of modern times, because they coincide not with their systems and their almanacs; but how many things exist which we are incapable of reconciling with our reason, and which have not even been perceived by it.

There are particular laws which prove the immediate

action of Providence on the human species, and which are contrary to the general laws of physics. For example, the principles of reason, of the passions, and of sentiment, as well as the organs of speech and of hearing, are the same in men of every country, and yet the languages of nations differ all over the world. Why is the art of speech so different among beings who are subject to the same wants? and why is it incessantly changing from father to son, so that we modern French no longer understand the language of the Gauls, and that one day our descendants will not be able to understand ours? The ox of Bengal, bellows like that of the Ukraine, and the nightingale pours forth in our climates the same strains that ravished the poet of Mantua on the banks of the Po.

It cannot be maintained, though it has been asserted by writers of high reputation, that the characters of languages are determined by the climate, for if they were subject to its influence, they would not vary in every country in which the climate is invariable. The language of the Romans was at first barbarous, afterwards majestic, and has at last become soft and effeminate. Languages are not rough to the north and smooth to the south, as has been alledged by J. J. Rousseau, who, in treating of this subject, has given too great an extension to physical laws. The language of the Russians in the north of Europe is very soft, being a dialect of the Greek; and the jargon of the southern provinces of France is harsh and uncouth. The Laplanders, who inhabit the shores of the Frozen Ocean, speak a language that is pleasing to the ear; and the Hottentots, who live in the extremely temperate climate of the Cape of Good Hope, cluck like turkey-cocks. The language of the Peruvians is full of strong aspirations and grating consonants. Without going farther than our closets, we may deduce the different characters of the languages of each nation, from the names which appear on the maps of their territory, and convince ourselves that their harshness or their softness has no relation whatever to their latitudes.

Other observers have pretended that it was the celebrated writers of a nation who determined and fixed its language: but the great writers of the Augustan age could not prevent the corruption of the Latin tongue previous to the reign of Marcus Aurelius. Those of the age of Louis XIV. already begin to be antiquated in France. If posterity fixes the character of a language to the ages which have been productive of great writers, it is not, as some have asserted, because it is then more pure; for we find in it as many inversions of phraseology, of those decompositions of words, and of those embarrassed syntaxes which render the metaphysical study of all grammar tiresome and barbarous; but it is because the writings of these great men sparkle with maxims of virtue, and present us with a thousand perspectives of the Deity. I doubt not that the sublime sentiments which inspire them, still continue to illumine them in the order and the disposition of their works, since they are the sources of all harmony. Hence, in my opinion, results the unalterable charm which renders the perusal of them so delicious to persons in all ages and of all nations; hence it is that Plutarch has eclipsed most of the writers of Greece, though he was neither of the age of Pericles, nor of that of Alexander, and that the translation of his writings into old French by the good Amyot will be more generally read by posterity than most of the original works even of the age of Louis XIV. It is the moral goodness of a generation which characterizes a language, and transmits it unchanged to the succeeding; for this reason it is that the languages, customs, and fashions of dress have in Asia been inviolably preserved from generation to generation, because parents there secure the affection of their children. But these reasons afford no explanations of the difference of language which exists between one nation and another. It will ever appear to me to be something supernatural, that men who enjoy the same elements, and are subject to the same wants, should not employ the same words to express them. The

sun dispenses light to the whole earth, but he bears a different name in every different country.

Here I cannot forbear taking notice of the effect of a law to which little attention has been paid; it is this: that there never arises any distinguished character, in any line whatever, but there appears at the same time, either in his own country or in some neighboring nation, an antagonist, possessing talents and a reputation totally opposite. Such were Democritus and Heraclitus, Alexander and Diogenes, Descartes and Newton, Corneille and Racine, Bossuet and Fenelon, Voltaire and J. J. Rousseau. Concerning these two last celebrated men, who were contemporaries, and died the same year, I had collected a great number of facts to demonstrate that throughout life they formed a perfect contrast in talents, manners, and fortunes; but I relinquished the parallel to devote my attention to the present work, which I deemed much more useful.

This balance between illustrious men will not appear extraordinary, if we consider that it is a consequence of the general law of contraries which governs the world, and whence result all the harmonies of Nature; it must therefore display itself in a particular manner in the human race, which is the centre of the whole, and it actually manifests itself in the admirable equilibrium conformably to which the two sexes are born in equal numbers. It does not attach to individuals in particular, for we see families consisting wholly of females, and others entirely of males; but it embraces the aggregation of a whole town, or of a nation, the male and female children of which are always born in nearly equal number. Whatever inequalities of sex there may be in the variety of births in families, the equality is restored in the aggregate of a people.

But there is another equilibrium no less wonderful, and of which I believe no notice has ever been taken. As a great number of males perish in war, in voyages, and in

laborious and dangerous occupations, it would thence follow that, in the course of time, the number of females would daily go on increasing. Supposing that one tenth part more of men than of women annually perishes, the balance of the sexes would become more and more unequal. Social ruin must increase from the very regularity of natural order. This, however, does not happen; the two sexes are always nearly equal in number; their occupations are different, but their destinies are the same. The women, who frequently instigate men to engage in hazardous undertakings, to support their luxury, and who frequently foment among them animosities and even wars to gratify their vanity, are carried off amid the security of pleasure, by diseases to which men are not subject, but which frequently result from the moral, physical, and political sufferings which the men endure on their account. Thus the equilibrium of birth between the sexes is re-established by the equilibrium of death.

Nature has multiplied these harmonic contrasts in all her works with relation to man; for the fruits which are subservient to our wants frequently possess opposite qualities, which operate as mutual compensations.

These effects, as we have elsewhere seen, are not the mechanical results of climates, to the qualities of which they are frequently opposed. All the works of Nature have the wants of man for their end, as all the sentiments of man have the Deity for their principle. It is the final intentions of Nature which have communicated to man the intelligence of all her works, as it is the instinct of the Deity which has rendered him superior to the laws of Nature. It is this instinct which, under the different modifications of opinion, impels the natives of Russia to plunge among the ices of the Neva, in the severest cold of winter, and those of Bengal to bathe in the waters of the Ganges; which has made the women of the same latitudes slaves in the Philippines and despots in Formosa; men effeminate in the Moluccas and valiant in Macas-

sar; and which forms among the inhabitants of the same city tyrants, citizens, and slaves.

The sentiment of the Deity is the first moving principle of the human heart. Observe a man in those unguarded moments, when the secret plans of attack and defence with which social man is continually surrounded are suppressed, not at the sight of a vast ruin which totally overturns them, but only on beholding an extraordinary animal or plant: "Ah, my God!" he exclaims, "how admirable is this!" and he calls the first person who passes that way to share his astonishment. His first movement is to exalt his joy to God, and the second to extend it to men; but social reason soon recals him to personal interest. When he sees a certain number of spectators assembled round the object of his curiosity: "It was I," says he, "who first made the discovery." Then, if he is a scholar, he fails not to apply his system to it. He soon calculates the advantage he shall derive from the discovery; he adds a few circumstances to make it appear still more wonderful, and employs all the influence of his party to puff it off, and persecute those who are not of his opinion. Thus every natural sentiment raises us to God, till the weight of our passions and of human institutions brings us back to self alone. For this reason J. J. Rousseau was perfectly right when he observed, "that man is good, but that men are wicked."

It was the instinct of the Deity which first collected men together, and which became the basis of the religion and of the laws that were to cement this union. It was on this that virtue reposed, when it resolved to imitate the Deity not only in the exercise of the arts and sciences, which the ancient Greeks denominated the minor virtues, but in the result of intelligence and divine power which is beneficence. It consisted in the efforts made against self for the benefit of mankind, with the intention of pleasing the Deity alone. It communicated to man a sense of his excellence, by excellence, by exciting the contempt for terrestrial and tran-

sient advantages, and the desire of things celestial and immortal. It was this sublime charm which converted courage into a virtue, and caused man to submit voluntarily to death, amidst such solicitude for the preservation of life. What hope couldst thou have on earth, brave d'Assas, when shedding thy blood at night, unseen, in the fields of Klosterkam to rescue the French army? And thou, generous Eustace de St. Pierre, what reward didst thou expect of thy country, when thou appearedst before the tyrant with a cord about thy neck, ready to suffer an infamous death to save thy fellow-citizens?* Of what advantage to your inanimate relics were the statues and the praises with which posterity was one day to honor you? Could you ever hope for this tribute to your sacrifices either unknown or branded with infamy? Could ye be flattered with the prospect of the empty applause of a world separated from you by everlasting barriers? And ye, still more meritorious in the sight of God, obscure citizens who die without glory, whose virtues draw upon you disgrace, calumny, persecution, poverty, and contempt even from those who dispense honours among men, would you pursue such rugged paths, were ye not guided by a ray of divine illumination?†

* The Chevalier d'Assas was a French officer, who was one night surprised by the advanced troops of the enemy, who were coming unexpectedly to attack the French army, which was totally unprepared for such an event. He was threatened with instant death if he made the least noise; but undaunted by the prospect of immediate and inevitable destruction, he cried out with all his power that the enemy was at hand. On the alarm thus given, the French troops were instantly under arms; but the brave d'Assas was cut to pieces by his enraged and disappointed opponents.

Eustace de St. Pierre was one of the six magnanimous citizens of Calais, who, after the taking of that place by our Edward III. voluntarily offered their lives to appease the rage of the irritated monarch, and to save their own from destruction. It is scarcely necessary to mention, that, on their arrival in the English camp, their lives were spared at the intercession of the queen. T.

† It is impossible to possess virtue without religion. I allude not to the theatrical virtues which procure us the applause of the public, by means so contemptible that they might be looked upon as vices. The very heathen have turned them into ridicule. Turn to what Marcus Aurelius says on this subject. By virtue I mean the good which we perform for our fellow-creatures without any hope of reward from them, and frequently at the

Respect for virtue is the source of that veneration which we pay to ancient nobility, and which has, in the end,

expence not only of fortune, but likewise of reputation. Analyse all those instances which appear striking, and you will find none but what exhibits the Deity either present or at a distance. I shall introduce one which is but little known, and which, on account of its very obscurity, is the more commendable.

In the last war in Germany, (commonly called the seven years' war), a captain of cavalry was ordered out to forage. He set off at the head of his company, and proceeded to the quarter assigned to him. It was a lonely valley, almost entirely covered with wood. He perceived a mean cottage, and knocked at the door, which was opened by an aged Herrnhuter, with a white beard. "Father," said the officer, "shew me a field where I may procure forage for my soldiers."—"Follow me," replied the Herrnhuter. The good man put himself at their head, and conducted them along the valley. In a quarter of an hour they arrived at a fine field of barley. "That is just what we want," said the captain. 'Come a little farther," said his conductor, "and you shall have no cause to complain." They accordingly proceeded, and half a mile farther came to another field of barley. The troop instantly alighted, cut down the grain, tied it up in bundles, and mounted their horses. The officer then said to his guide—"Father, you have brought us all this way without occasion; the first field was better than this."—"Very true, Sir," replied the good old man, "but it was not mine."

This reply goes to the heart. I defy an atheist to make one like it. It may not be amiss to observe that the Herrnhuters are a kind of quakers, scattered over several provinces of Germany. Some divines have maintained that heretics are incapable of virtue, and that their virtue is destitute of merit. As I am not a divine, I shall not involve myself in this metaphysical discussion, though I could oppose to their opinion the sentiments of St. Jerome, and even those of St. Peter, with regard to the heathen, when he said to Cornelius the centurion: "Of a truth I perceive that God is no respecter of persons: but in every nation he that feareth him and worketh righteousness is acceptable with him." (Acts. chap. x. v. 34 and 35). But I am anxious to know what these divines think of the charity of the Samaritan, who was a schismatic. In my opinion, they can have no objection to make against the judgment of Jesus Christ. As the simplicity and the profound wisdom of his divine answers form an admirable contrast with the insincerity and subtilties of the doctors of those times, I shall quote the whole passage of scripture to which I allude. "And behold a certain lawyer stood up and tempted him, saying: 'Master, what shall I do to inherit eternal life? He said unto him: What is written in the law? how readest thou? And he answering said: Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy strength, and with all thy mind, and thy neighbor as thyself. And he said unto him: Thou hast answered right; this do, and thou shalt live. But he, willing to justify himself, said unto Jesus; and who is my neighbor? And Jesus answering said: A certain man went down from Jerusalem to Jericho, and fell among thieves, which stripped him of his raiment and wounded him, and departed, leaving him half dead. And by chance there came down a certain priest that way, and when he saw him he passed by on the other side. And likewise a Levite, when he was at the place, came and looked on him and passed by on the other side. But a certain Samaritan, as he journeyed, came where he was; and when he saw him he had compassion on him and went to him and bound up his wounds, pouring in oil and wine, and set him on his

introduced unjust and odious differences among men, whereas originally it was designed to establish only respectable distinctions. The more equitable Asiatics have attached nobility only to places rendered illustrious by virtue. An aged tree, a wall, a rock, objects possessing stability, have to them appeared exclusively capable of perpetuating the remembrance of it. In Asia there is not a single acre of land but what is illustrious. The Greeks and the Romans, who, like all the other nations of the globe, derived their origin from that part of the world, and removed to no great distance from it, imitated in part the customs of our first parents. But the other nations,

own beast, and brought him to an inn and took care of him. And on the morrow when he departed he took out twopence and gave them to the host, and said unto him: Take care of him, and whatsoever thou spendest more, when I come again I will repay thee. Which now of these three thinkest thou was neighbor to him that fell among the thieves? And he said: He that shewed mercy on him. Then said Jesus unto him: Go and do thou likewise."

To this I shall forbear adding any reflection. I shall only observe, that the action of the Samaritan is far superior to that of the Herrnhuter; for though the sacrifice of the latter was the greatest, he was in some measure obliged to it by force: it was absolutely necessary that forage should be had from some field or other. But the Samaritan obeyed solely the impulse of humanity. His action was free, and his charity gratuitous. This parable, like all those in the gospel, comprehends in a few words a multitude of luminous instructions on the second of our duties. It would be impossible for imagination to substitute others of equal value. Reflect on all the circumstances of the solicitude of the charitable Samaritan. He dresses the wounds of the unfortunate man, sets him upon his own horse, endangers his life by stopping and travelling on foot through a country frequented by robbers. He then conveys him to an inn, provides both for the present and future wants of the stranger, and continues his journey without expecting any return from his gratitude.

To this note, already long enough, the translator begs leave to add a few observations for the purpose of correcting some errors into which the author has been led respecting the Herrnhuters, or, as he calls them, *Hernoutens*. These Herrnhuters are the same Protestant sect which in England is generally known by the name of Moravians, but who distinguish themselves by the appellation of the United Brethren. This being premised, the reader need not be told that they are neither a kind of quakers, nor wear the venerable beards assigned to them by the author. The fact itself is the more probable, as many of their settlements in Germany were in imminent danger from the armies opposed to each other during the seven years' war, and one of them, Neasalz in Silesia, was even plundered and burned. Inaccuracy in point of names is a privilege to which French writers seem to assert an undisputed claim; but the translator must confess it was not without considerable surprise that he found all the errors here noticed, even of orthography, retained in the version of a British divine, the late Dr. Hunter.

who spread over the rest of Europe, in which they long wandered about, and who left far behind them these ancient monuments of virtue, preferred seeking them in the posterity of their great men, and beholding living images of them among their children. This, in my opinion, is the reason why the Asiatics have no nobility, and why the Europeans have no monuments.

This instinct of the Deity constitutes the charm of our most agreeable books. The writers whom we are never tired of perusing, are not those who possess the most wit, that is, such as abound in that social reason which lasts but for a moment, but those who are incessantly bringing Providence into action. Hence it is that Homer, Virgil, Xenophon, Plutarch, Fenelon, and most ancient writers have acquired immortality, and afford delight to readers of every nation. For the same reason voyages and travels, though written in general in a style of great simplicity, and decried by a numerous class of persons, who there discover an indirect censure of themselves, are nevertheless the most interesting works in modern literature, not only because they display new blessings of Nature, in treating of the fruits and animals of foreign countries, but on account of the dangers by land and sea which their authors frequently escape, contrary to all human expectation. Finally, it is because most of our learned writers deviate from this natural instinct, that they are so dry and so disgusting, and that posterity will prefer Herodotus to David Hume, and the mythology of the Greeks to our treatises on physics, because we are better pleased to hear fables of the Deity introduced into the history of man, than to see human reason mingled with the history of the Deity.

This sublime sentiment excites a propensity to the marvellous in man, whose natural weakness would condemn him to creep for ever on the earth of which he is formed. It balances within him the sentiment of his misery, which attaches him to the pleasures of habit, and

exalts his soul by inspiring him incessantly with the desire of novelty. It is the harmony of human life, and the source of every thing we can find in it delicious and captivating. It is this that affords a disguise to the illusions of love, which always imagines that it beholds a divine object in the object beloved. It is this that presents to ambition unbounded prospects. A peasant appears desirous of nothing in the world but to become a churchwarden of his village. But will he stop there? Open for him a career without obstacle; he is a groom, a highwayman, a leader of a gang of robbers, a general of armies, a king; at last he will require adoration.* He will be a Tamerlane or a Mahomet. An opulent citizen, fixed by age and the gout in his arm-chair, has, he will tell you, no other ambition but to die in peace. He, however, beholds himself flourishing to the remotest period of time in his posterity. He secretly gratifies himself with the idea of their attaining, by means of his money, to all the gradations of dignity and honor. He never reflects that in a very short time he shall have nothing in common with them, and that while he congratulates himself on laying the foundation of his future glory, he is industriously striving to conceal the meanness of his own origin. The very atheist, with his negative wisdom, is irresistibly carried away by this impulsion. In vain he demonstrates the nothingness and the revolution of all things; his heart contradicts his reason. He secretly flatters himself that his book or his tomb will one day procure him the applause of posterity, or perhaps that the book and the tomb of his enemy will cease to obtain it. He denies the existence of the Deity only because he puts himself in his place.

With the sentiment of the Deity every thing is grand,

* Of the truth of these observations the history of the world affords numerous instances; but no period has displayed one more striking than the present age. Need I say that I allude to the self-created imperial ruler of France, and the blasphemous adulation of his cringing slaves? T.

noble, beautiful, invincible, in circumstances the most indigent; without it all is feeble, disagreeable, and bitter, even in the midst of grandeur. 'Twas this that conferred empire on Sparta and on Rome, by pointing out the gods as protectors and fellow-citizens to their virtuous and poor inhabitants. It was the destruction of this sentiment that consigned them to slavery, wallowing in riches and in vice, when they beheld in the universe no other gods than gold and pleasures. To no purpose does man accumulate around him the gifts of fortune; no sooner is this sentiment banished from his heart, than languor takes possession of it. If its absence be of long duration, he is plunged into dejection, then into gloomy melancholy, and at last into despair. If this state of anxiety be incessant, he puts a period to his life. Man is the only being endued with sense, who destroys himself in a state of liberty. Human life, with its pomp and its enjoyments, no longer appears life when it ceases to appear immortal and divine.*

Whatever may be the disorder prevailing in human societies, this celestial instinct delights to dwell among the

* Plutarch remarks that Alexander did not resign himself to the vices which sullied the conclusion of his glorious career, till he imagined himself abandoned by the Gods. This sentiment is not only productive of misery when it is banished from our pleasures, but when, in consequence of our passions or our institutions, which pervert the laws of Nature, it is applied to our woes themselves. Thus, for example, if, after having given mechanical laws to the operations of the soul, we apply the sentiment of infinity to our physical and transient afflictions, our misery, by a just reaction, then becomes insupportable. I have sketched but a faint outline of the action of the two principles of man, but to whatever sensation of pleasure or of pain we apply them, we shall find the difference of their nature and their perpetual re-action.

With regard to Alexander abandoned by the Gods, I should be surprised if the expression of this situation had not inspired some artist of Greece. On this subject Addison says, that in the gallery of Florence there was a beautiful bust of Alexander the Great, the face turned towards Heaven, with a certain noble air of grief and dissatisfaction. He adds that he had seen two or three ancient busts of Alexander, with the same air and the same attitude, whence he was led to imagine that the sculptor intended to represent the conqueror weeping for new worlds, or some other similar circumstances of his history. The only circumstance of his history to which, in my opinion, these busts ought to be referred, is that of his complaining of being abandoned by the Gods. I have no doubt that this would have been the judgment of the ingenious Addison, had he recollected the observation of Plutarch.

children of men. It inspires men of genius by exhibiting itself to them clothed in eternal attributes. It presents to the mathematician the ineffable progressions of infinity, to the musician enchanting harmonies, to the historian the immortal shades of virtuous men. It creates a Parnassus for the poet, and an Olympus for the hero. It embellishes the gloomy days of the lower classes of the people. Amidst the luxury of Paris, it causes the poor native of Savoy to sigh after the snow-covered summits of his mountains. It traverses the vast ocean, and summons the European sailor from the genial climes of India to the tempestuous shores of the west. It provides a country for the wretched, and excites regret in those who have lost nothing. It diffuses over our bowers the charms of innocence, and over the tombs of our fathers the hopes of immortality. It reposes in the midst of tumultuous cities on the palaces of mighty monarchs, and on the august temples of religion. It frequently fixes its abode in deserts, and attracts to rocks the respect of the universe. 'Tis thus that it has covered you with majesty, ye ruins of Greece and Rome, and you too, mysterious pyramids of Egypt! It is this that we are incessantly seeking amid our restless occupations; but whenever it appears in some unexpected act of virtue, in any of those circumstances which are called interpositions of heaven, or in any of those sublime and ineffable emotions which are denominated by way of excellence traits of sentiment, its first effect is to produce a powerful emotion of joy, and the second is to cause us to shed tears. The soul, struck with this divine light, rejoices to obtain a glimpse of its heavenly native land, and is afflicted at the idea of being exiled from it.

> Oculos errantibus alto
> Quæsivit cœlo lucem, ingemuitque reperto.
>
> *Æneid, book 4.*

STUDY XIII.

APPLICATION OF THE LAWS OF NATURE TO THE EVILS OF SOCIETY.

I HAVE exposed in this work the errors of our opinions, the evils which have resulted from them for manners and social happiness; I have refuted those opinions, and even the very methods of our sciences; I have investigated, certain laws of Nature, and applied them, I think I may venture to say, happily to the vegetable order: but in my opinion, all this labor would be in vain, were I not to direct it to the discovery of some remedies for the evils of society.

A Prussian of the present day, who has written much has abstained from making any remarks on the government of his country, "because," as he says, "being only a passenger in the vessel of the state, it is not his province to interfere in the management of her." For my part I think it a duty highly incumbent on me to treat of the vessel of the state, because I am a passenger, and must be interested in the prosperity of the voyage. It is my duty to employ the leisure afforded me by my very situation as a passenger, to apprize the pilots of the irregularities which I perceive on board Such is the example which appears to have been given us by our Montesquieus, our

Fenelons, and many other illustrious men, who, in every country, have devoted their vigils to the welfare of their fellow-citizens. The only solid objection that can be alleged against me is my inability. But I have witnessed much injustice; I have myself been a victim of it. The images of disorder have excited in me ideas of order. Besides, my errors will serve to display the sagacity of those who shall correct them. If I present but one single useful idea to my prince, whose bounty has hitherto supported me, though my services have gone unrewarded, I shall obtain a recompence the most precious; if I may flatter myself with having dried the tears of some unhappy being, at the latest moment of life this recollection will wipe away my own.

Those who profit by the calamities of their country, will reproach me with being its enemy, and alledge, as usual, that things have always been as they are now, and that every thing is going on well, because their own affairs are prosperous. But it is not those who expose the calamaties of their country that are its enemies, but those who flatter it. Most assuredly the writers, as Horace and Juvenal, who predicted to Rome her destruction, even amidst all her grandeur, were more strongly attached to her welfare than those who flattered her tyrants and took advantage of her disorders. How long did the Roman empire survive the predictions of the former? The good princes who afterwards assumed the reins of government could not reform it, because they were deceived by cotemporary wtiters, who never ventured to attack the moral and political cause of corruption. They were contented with confining their reform to themselves, and had not even the courage to extend it to their families. Thus reigned a Titus and a Marcus Aurelius. They were only great philosophers upon a throne. For my part, I think I have already deserved well of my country, if I have only told her this terrible truth, that she contains in her bosom more than seven millions of paupers, and that their num-

der has been annually increasing since the age of Louis XIV.

God forbid that I should wish for the destruction of the different orders of the state. I am only desirous to bring them back to the spirit of their original institution. Would to heaven that the clergy deserved by their virtues the first rank conferred by the sanctity of their functions, and that the nobility protected the citizen, and rendered themselves formidable only to the enemies of the people: that the financial department, pouring its treasures into the channels of commerce, and agriculture, left open to merit avenues to places of every kind; that each woman, exempted by the weakness of her constitution from most of the burdens of society, were engaged only in fulfilling the pleasing duties of a wife and a mother, in constituting the felicity of a single family; that, endowed with graces and with beauty, she considered herself as a flower in that chain of pleasures with which Nature has bound man to life, and that while she is the crown and the joy of her husband in particular, the entire chain of her sex consolidated the mass of national happiness!

I seek not the applause of the multitude; by such I shall not be read: besides, they are sold to the opulent and the powerful. It is true, the people are continually railing against them, and even applaud such as oppose them with firmness: but they abandon them to their fate as soon as they perceive that they are the objects of the hatred of the rich. They tremble at the menaces of the latter, or they crouch at their feet on receiving the least mark of benevolence. By the people I mean not only the lowest class of society, but a great number of others, who think themselves much above it

The people are not my idol. If the powers which govern them are corrupt, they are themselves the cause of it. We reprobate the reigns of Nero and Caligula, but those wicked princes were the fruits of their age, as bad fruits are produced by bad trees: they would not have been ty-

ants had they not found among the Romans informers, spies, satellites, poisoners, prostitutes, executioners, and flatterers, who told them that every thing was going on well. I do not look upon virtue as the portion of the people; but I think that it is divided among all conditions, that it is rare among the low, among the middling classes, and among the great, and yet so necessary for the preservation of all the orders of society, that if it were entirely destroyed, the country would crumble into ruin like a temple whose foundations have been undermined.

But though it is neither the praises nor the virtues of the people that are particularly interesting to me, its labors however are. From the people proceed most of my pleasures and of my sorrows; it is they that supply me with food, with clothing, with lodging, with superfluities, while they themselves are sometimes in want of the necessaries of life; from them likewise proceed contagion, robbery, sedition, and were I no farther concerned than as a mere spectator of their happiness or of their misery, they would not be indifferent to me. Their joy excites in my heart an involuntary joy, and their wretchedness afflicts me. It is not by paying for their services with money that I can acquit myself of all obligation towards them. It is a maxim of a rich and hard-hearted man: "I owe that workman nothing; I have paid him." The money which I give to the people in return for their services, creates nothing new for their use; it would circulate just the same, and perhaps more usefully for them if I had never existed. The people therefore bear the burden of my existence, without any return on my part; and what is still worse, they are likewise loaded with that of my irregularities. I am accountable to them, more than to the magistrates, for my virtues and my vices. If I deprive them of a portion of their subsistence, I oblige him who is in want of it to become a beggar or a robber; if I debauch a female, I rob society of the mother of a family; if I appear irreligious, I weaken the hopes which

support them under their labors. Besides, religion gives me a positive command to love them. When it enjoins me to love mankind, it is the people whom it designs and not the great; to them it attaches all the powers of society, and which exist only by them and for them. Differing widely from the system of modern policy, which presents the people to kings as their property, it presents kings to the people as their fathers and their defenders. The people are not made for kings, but kings for the people. I, then, who am nothing and can do nothing, may at least offer up ardent wishes for their felicity.

I must do this justice to our nation to acknowledge that I am not acquainted with one more generous in Europe, though it is the most miserable that I know, liberty excepted. I could relate a great number of anecdotes of its benevolence, if time permitted. Our wits frequently draw caricatures of persons in low life, and of our peasantry, because they have no other object than to amuse the rich; but they would furnish them with some excellent lessons of virtues, if they knew how to study those of the people. For my part, I have more than once found among them ingots of gold upon a dunghill.

I have remarked, for example, that many petty shopkeepers sell their commodities at a much lower price to the poor than to the rich, and when I have asked the reason, they have replied: "Every body must live, Sir." I have likewise observed that many of the common people never cheapen when they are dealing with persons as poor as themselves: "They must earn a livelihood," say they. One day I saw a little child buying greens of a greengrocer; the woman gave the child an apron full for a penny, and when I expressed my astonishment at the quantity, "Sir," said she, "I should not give so much to a grown-up person, but I should be very sorry to cheat a child." When I lived in the street de la Magdaleine, I employed a porter, a native of Auvergne, name Christal, who for five months gratuitously maintained a maker of tapestry

a stranger to him, and who had come to Paris on the business of a law-suit, "because," as he told me, "this man had on the road, in the public stage, from time to time assisted his wife, who was sick." The same porter had a son eighteen years old, paralytic and an idiot from his birth, whom he supported with the tenderest affection, refusing to place him in the Hospital for Incurables, though persons who possessed sufficient influence had frequently offered to exert it in his behalf. "God gave him to me," said he, "and it is my duty to take care of him." I have no doubt that he still maintains this son, though he is obliged himself to feed him, and his wife is frequently ill. I once stood still with admiration to look at a bashful pauper seated on a post in the street Bergère, near the Boulevards. Well-dressed people passed by without giving him any thing; but there were few servant-maids or women carrying baskets, but what stopped to bestow their mite. He wore a wig well powered, his hat under his arm, had a great coat, clean linen, and his appearance was so respectable, that when these poor people were bestowing their alms, you would rather have imagined that they were receiving charity from him. It is impossible to refer this sentiment of generosity in the people to any secret motive of self-interest, as the enemies of mankind, who have attempted to explain the causes of compassion, alledge. None of these poor women imagined herself in the situation of the unfortunate man, who, it was said, had been a watch-maker, and had lost his sight; but they were impelled by that sublime instinct, which interests us more in the distresses of the great than in those of other men, because we compare the magnitude of their misfortunes to that of their elevation and of their fall. To servant maids a blind watch-maker was a Belisarius.

I could adduce instances of this kind without end: they would be thought worthy of the admiration of the rich if they were taken from the history of the savages, or from that of the Roman emperors, if they were two thousand

years, or two thousand leagues distant from us. They would amuse their imagination, and pacify their avarice. Certainly our own people are worthy of our love. I could prove that their moral goodness is the firmest support of the government, and that, in spite of their necessities, it is they who make amends for the scanty pay of our soldiers, and who supply with necessaries the prodigious number of poor with which the kingdom swarms.

Salus populi suprema lex est, was a saying of the ancients: the welfare of the people is the supreme law, because their wretchedness is productive of general misery. This axiom should be held the more sacred by legislators and reformers, as no law can be durable, and no plan of reform can be executed, till the welfare of the people is first established. It is their miseries which beget abuses, which keep them up, and renew them. It is because they did not build upon this foundation that so many illustrious reformers have beheld their political edifice crumble into ruins. If Agis and Cleomenes failed in their endeavors to bring about a reform in Sparta, it was because the unfortunate Helots saw with indifference a system of happiness in which they were not comprehended. If China was conquered by the Tartars, it was because the discontented Chinese groaned under the tyranny of their mandarins, while their sovereign was kept in total ignorance of the matter. If Poland was divided in our own time by her neighbours, it was because her enslaved peasants and her menial gentry did not defend her. If so many reforms with regard to the clergy, the military, finance, justice, commerce, and concubinage have been attempted in vain, it is because the misery of the people is incessantly producing the same abuses.

In all my travels I never saw a more flourishing country than Holland. Its capital contains at least one hundred and eighty thousand inhabitants. The immense trade of that city throws a thousand temptations in the way, yet you never hear of a robbery, nor are soldiers

ever employed to mount guard. When I was there in 1762, there had not been a single execution for eleven years. The laws are nevertheless severe; but the people, who easily find means to earn a subsistence, are not tempted to infringe them. It is even worthy of remark that though they have expended millions in printing all our extravagances in morality, in politics, and in religion, neither their opinions nor their manners have been vitiated, because they are content with their condition. Crimes are generated only by indigence and by excessive opulence. When I was at Moscow, an old man, a native of Geneva, who was in that city at the time of Peter I. informed me, that since various means of subsistence had been afforded to the people by the establishment of manufactures and commerce, seditious, assassinations, robberies, and conflagrations had become much less frequent than before.—Had there not been multitudes of miserable wretches at Rome, a Catiline would never have existed. The police, it is true, prevents public disturbances at Paris; it may even be asserted that fewer crimes are committed in that capital than in the other cities of the kingdom, in proportion to their population; but the tranquillity of the people of Paris proceeds from their possessing more numerous means of subsistence than those of the other towns, because the rich flock thither from all the provinces. After all, the expence of police-officers, of spies, of prisons, and places of confinement, is defrayed by these same people, and this sum is employed in the inflicting of punishments when it might be devoted to purposes of benevolence. These expedients are, besides, nothing but repercussions that involve the people in secret irregularities, which are equally dangerous.

The first method of diminishing the indigence of the people is to reduce the excessive opulence of the rich. It is not the latter that afford a livelihood to the lower classes, as some modern politicians affirm. They may pretend to calculate the wealth of a state; the mass of it

is certainly limited; and if the whole happens to be in the possession of a small portion of citizens, it is not of any service to the multitude. As they always see in small characters men concerning whom they care very little, and in large capitals the money of which they are extremely fond, they think it more beneficial to the kingdom that an income of one hundred thousand crowns should centre in one and the same person, than that it should be divided among one hundred families, "because," say they, "great capitals produce great undertakings:" but this is a most pernicious error. The wealthy possessor keeps only a few more servants, and spends the rest of his superfluity in articles of luxury and corruption. It is necessary that he should enjoy it in his own way, for if he be avaricious, the money is totally lost to society. But one hundred families of good citizens might live with comfort on such a revenue. They would bring up a great number of children, and would maintain a multitude of other families by means of arts that are not only useful, but likewise friendly to morals.

In order therefore to diminish opulence, without, however, doing injustice to the rich, it would be necessary to put a stop to the venality of places, in consequence of which they are monopolized by that class of society which could best dispense with them, since they are conferred only on those who possess money. It would be necessary to destroy the duplicity, the triplicity, and the quadruplicity which accumulate them on a single head, as well as the reversions which perpetuate them in the same families. This abolition would undoubtedly destroy that aristocracy of gold which keeps gradually extending in the bosom of the monarchy, and placing an insurmountable barrier between the prince and his subjects, becomes in the end the most dangerous of all governments. By such a measure the dignity of offices would be augmented; they will be more worthy of esteem when they shall be the reward of merit, and not the price of money: it would

diminish that respect for wealth which has corrupted our morals, and would increase the veneration due to virtue it would open to all the orders of the state the avenue to public employments, which, for a century, has been the patrimony of four or five thousand families, who shift all offices from one to another, without suffering the rest of the citizens to partake of them, till they divest themselves of that character, that is, till they sell them their liberty, their honor, and their consciences.

Our kings have been persuaded that it was safer for them to rely on the purses of their subjects than on their probity. This is the origin of the venality in the civil state, but the fallacy of this sophism is apparent, when we consider that it exists neither in the ecclesiastical nor in the military condition, and that those great bodies are, as far as concerns their individuals, the best regulated in the state, at least with respect to their police and their particular interests.

The court frequently employs the changes of fashion to give subsistence to the people from the superfluities of the rich. This palliative is good, though it is attended with great inconveniences; but at any rate it ought to turn to the advantage of the poor, and all commerce in foreign luxuries should be forbidden, for it would be very inhuman to suffer the rich, who draw all the money from the nation, to send every year a considerable part of it to India and China, in order to procure muslins, silks, and porcelain, which they may find at home. The trade to India and China is adapted only to nations, who, like the Dutch and English, have neither mulberry-trees nor silk-worms. These may likewise be permitted to purchase tea and to drink it, because their countries produce no wine. But whenever we buy a piece of cotton in Bengal, we prevent an inhabitant of our islands from cultivating the plants which would have produced the raw material, and a family in France from spinning and weaving it. It is likewise a moral obligation to restore to the women the

occupations which belong to them, such as those of midwives, milliners, mantau-makers, and all such as require nothing more than address and a sedentary life in order to rescue numbers of them from indolence and prostitution, in which they seek the means of supporting a wretched existence.

A grand source of subsistence would likewise be opened to the people by suppressing the privileges of commercial and manufacturing companies. These companies, we are told, give bread to a whole province. Their establishments indeed appear striking at the first view, especially in the country. They exhibit long avenues of trees, vast buildings, numberless courts, palaces; but they enable the proprietors to ride in their coaches, and compel the rest of the village to wear wooden shoes. I never saw peasants more wretched than in the villages where there are privileged manufacturers. These privileges tend more than can be conceived to check the industry of a country. I shall quote on this occasion what is said by an anonymous English writer, distinguished for soundness of judgment and impartiality. "I passed," says he, "through Montreuil, Abbeville, and Pequigni. The second of these towns likewise has its *chateau;* its indigent inhabitants highly extol their manufacture of cloth, but it is less considerable than those of many villages in Yorkshire."* To the cloth manufacturers of the villages of Yorkshire I could however oppose those of handkerchiefs and of cotton and woollen stuffs in the villages of the Pays de Caux, which are very flourishing, and the peasants of which are very opulent, because there is no such thing among them as exclusive privileges. The privileged manufacturers finding themselves without competitors, oppress their workmen as much as they please. They employ a thousand artifices to reduce them to the lowest possible wages. They advance them money, for example, and when they have

* Travels in France, Italy, and the islands of the Archipelago in 1757

made them their debtors beyond the possibility of re-payment, for which a few crowns are sufficient, they then have them in their power. I know a considerable branch of maritime fishery, which is almost totally ruined in one of our ports by this fatal species of monopoly. The citizens of that town first purchased the fish of the fishermen, for the purpose of curing and selling it; they afterwards built fishing-smacks, and then advanced money to the fishermen's wives during the absence of their husbands. The latter were obliged on their return, to hire themselves to the citizens, in order to pay their debt. When the citizens were masters of the boats, the fishermen, and their fish, they regulated the conditions of the fishery at pleasure. Most of the fishermen were disgusted with the smallness of their profits, and the fishery, which formerly rendered the town so flourishing, has now dwindled almost to nothing.

If I am desirous that no intruders should run away with the means of subsistence bestowed by Nature on each rank of society and on each sex, still less should I wish monopolizers to appropriate to themselves those which she has given to each individual. For example, the author of a book, of a machine, of any invention for utility or pleasure, to which a man has devoted his time, his labor, and his genius, ought to be at least as justly entitled to a premium in perpetuity from those who sell his book, or make use of his invention, as the lord of the manor to receive fines from those who build upon his domain, and even from such as dispose of their houses. Such a right appears to me to be much more consonant to the law of Nature than fines of alienation. If the public is put in possession of a useful invention, it is the duty of the state to make compensation to the author, that his glory may not be converted into his ruin. If this equitable law existed we should not see twenty booksellers living at their ease at the expence of an author who sometimes has not a morsel to eat. We should not have seen in our own

times the posterity of Corneille and of La Fontaine reduced to beggary, while the booksellers of Paris are purchasing superb country-seats with the profits of their works.

Great landed estates are still more prejudical than extensive capitals or emoluments, because they rob the other citizens, at one and the same time, of social and natural patriotism. They moreover become, in process of time, the property of those who have offices and money; they place under the discretion of such persons all the subjects of the state, and allow them no other resource for a subsistence than either to become corrupt and flatter the passions of those who are in possession of wealth and power, or to abandon their country. These three causes combined, and particularly the last, led to the destruction of the Roman empire, as was justly remarked by Pliny, so early as the reign of Trajan. They have already driven out of France a greater number of subjects than the revocation of the edict of Nantes. When I was in Prussia, in 1765, there were no less than fifty thousand deserters among the regular troops maintained by the king, and at that time amounting to one hundred and thirty thousand. I cannot think that the number stated to me was exaggerated, for I remarked that one third of all the guards through which I passed consisted of Frenchmen; and these guards are stationed at the gates of all the towns, and in all the villages upon the great roads, especially towards the frontiers. When I was in the Russian service, there were computed to be nearly three thousand teachers of my nation at Moscow, and among these I knew many persons of respectable families, lawyers, young ecclesiastics, gentlemen, and even officers. Germany swarms with our unhappy countrymen. In the courts both of the north and south, the dancers and the actors are French. Thus much we have in common with the modern Italians, and with the ancient Greeks of the Eastern Empire. We seek for a subsistence in a different country from that which gave us birth. We see no other nation of Europe wandering in this manner

over the face of the earth, unless it be certain natives of Switzerland, who are engaged in commerce, but who return to their country after they have made their fortune. The French never return, because the precarious professions they exercise, prevent them from ever amassing sufficient to live upon in their native land. Our men of letters who have not emigrated, or who reflect but superficially, exclaim from time to time against the revocation of the edict of Nantes; but if they expect to bring back to France the children of French refugees, they are grossly mistaken. Assuredly those who are rich, and are advantageously settled in foreign countries, will not leave their establishments for the purpose of returning to France; none but poor Protestants, therefore, would come back. But what would they do there, when so many native Catholics are under the necessity of emigrating for want of subsistence? I have been more than once astonished that our pretended politicians demand so many citizens of religion, and that they abandon by their silence such a great number to the avidity of our great proprietors. The truth must be told: they have written rather from hatred to priests than from love towards men. The spirit of toleration which they are desirous of establishing, is a vain pretext beneath which they shelter themselves; for the Protestants, whom they want to recal, are as intolerant as they accuse the Catholics of being, as was proved some years since in the very country of liberty, in England, by those who set fire to the chapel of the Spanish ambassador. Intolerance is a vice of European education, which manifests itself in literature, in systems and in religion. There is another reason for these clamors; it is the same reason which makes them contend for the ennobling of commerce, and maintain profound silence with regard to that of agriculture, the most noble of all conditions from its very nature. It is, since it must be told, because the rich merchants and great proprietors give good suppers, to which they invite handsome women, who make and unmake reputations of

every kind, and because the laborers and emigrants cannot give any. The table is now the main spring of the aristocracy of the rich. By means of this, an opinion on which sometimes depends the ruin of a state, acquires a preponderance. There too the honor of a soldier, of a bishop, of a magistrate, of a man of letters, frequently depends on a woman who has lost her own.

Modern policy has likewise advanced a very great error in asserting that riches always find their level in a state. When the indigent have increased in it to a certain degree, there is a competition among these unhappy wretches, who shall dispose of himself at the cheapest rate. While, on the one hand, the rich man importuned by his famished countrymen, who demand employment, raises the value of his money, they, to obtain a preference, lower the price of their labor, so that at length they cannot procure a subsistence. Agriculture, manufacturers, and commerce are then seen to droop in the most favored countries. Consult on this subject the accounts of various provinces of Italy, and among the rest what Mr. Brydone says in his highly intelligent Travels;* notwithstanding the remonstrances of a canon of Palermo, against the luxury and the prodigious wealth of the nobility and clergy of Sicily, and the extreme misery of its peasantry, you will see whether money will find its level there. I have been at Malta, which can by no means be compared for fertility of soil to Sicily, being nothing more than a white rock: but this rock abounds in foreign riches from the perpetual revenue

* I quote a great number of books of travels, because they are what I ove and esteem the most among the productions of modern literature. I have travelled a great deal, and can assert that I have almost always found them unanimous concerning the productions and manners of every country, when the spirit of a nation or of a party is not introduced into them. A very small number whose air of romance strikes you at first sight must be expected. Every body decries them, and yet every body consults them. It is to these sources that geographers, natural philosophers and historians, merchants, political writers, philosophers, compilers of every description, historians of foreign countries, and even our own, apply for information when they are desirous of discovering the truth.

of the commanderies of the order of St. John, whose funds are situated in all the catholic countries of Europe, and from the property left by the knights who die in foreign parts, and annually conveyed thither. It might be still more wealthy, in consequence of the convenience of its port, situated more advantageously than any other in the Mediterranean, and yet the peasant is exceedingly miserable. His whole dress consists of a pair of drawers, which reach no lower than his knees, and a shirt without sleeves. Sometimes he may be seen standing in the public place, with his legs and arms bare and half roasted by the sun, to hire himself for a shilling a day, with a horse and carriage capable of containing four persons, from day-break till midnight, and to go to any part of the island that he may be ordered by the traveller, who has no occasion to give either him or his beast so much as a glass of water. He runs along barefoot over the rocks, leading his horse by the bridle before the indolent knight, who frequently speaks to him only for the purpose of abusing him as a low bred scoundrel, whereas his conducter never replies but with hat in hand, and calling him *your most illustrious lordship*. The treasury of the republic is full of gold and silver, and the people are paid only in copper money, called four *tarini* pieces, the imaginary value of which is about eight-pence sterling, and the intrinsic worth about a halfpenny. It has this motto: *Non æs, sed fides*—Not money, but confidence. What an immense distance exclusive property and gold place between men! A sturdy porter in Holland asks you as much in *gut geldt*, that is, in good money, for carrying your portmanteau from one street to the next, as the humble Maltese receives for driving you about a whole day with three of your friends. The Dutchman is well-dressed, and his pocket is full of gold and silver. His coin has a very different inscription from that of Malta. You see upon it: *Concordiâ res parvæ crescunt:*—Small things increase by concord. There is in fact as much difference between the power and felicity

of the one state and of the other, as between the inscriptions and the substances of their coin.

It is in Nature that we ought to seek the subsistence of a people, and in their liberty the channel through which it ought to flow. The spirit of monopoly has destroyed among us many branches which are productive of great wealth to our neighbors; such, among others, are the whale, the cod, and the herring fisheries. I admit, however, on this occasion, that there are enterprizes which require the concurrence of a great number of hands, as well for their preservation and protection, as to accelerate their operations; such are the maritime fisheries; but it is the duty of the state to undertake the administration of these. Companies, among us, have not been influenced by a patriotic spirit; they are only established to form, as it were, distinct, petty states. The same is not the case with the Dutch. For example, as they go beyond Holland to catch herrings, because that fish is so much the better the farther it is taken towards the north, they have ships of war for the purpose of protecting the fishery. They have others with very capacious hulls, called busses, which catch the herrings night and day with nets, and others again which are very swift sailers, and carry them perfectly fresh to Holland. A premium is besides offered for the first ship that arrives with a cargo at Amsterdam. The fish in the first barrel are paid for at the rate of a gold ducat, or nine shillings English, a piece; and the rest of the cargo at the rate of a florin, or two shillings. These encouragements induce the fishermen to advance as far as possible towards the north, to meet the fish, which are there of a size and flavor far superior to those caugh. in the vicinity of the coasts. The Dutch have erected a statue to the first inventor of the method of smoking and making what is called pickled herrings. They justly conceived that the citizen who procures for his country a new medium of subsistence, and a new branch of commerce, deserves to be placed in the same rank as those

who enlighten or who defend it. From these attentions it is obvious with what vigilance they watch over every thing that is capable of contributing to public abundance. It is inconceivable what advantages they have derived from an infinite number of productions which we suffer to go to waste, and of their sandy, marshy, and naturally poor and barren country. I never witnessed in any such abundance of every thing. They have no vines, and yet there is a greater quantity of wine in their cellars, than in those of Bourdeaux; they have no forests, and yet they have more timber in their dock-yards than there is at the sources of the Meuse and of the Rhine, from which they obtain their oak; they have very little arable land, and yet there is more wheat in their granaries than France reserves for the consumption of her inhabitants. The same is the case with regard to articles of luxury; for though their garments and houses are simple, there is perhaps more marble for sale in their shops, than is cut in the quarries of Italy and the Archipelago; more diamonds and pearls in their caskets than in those of the jewellers of Portugal; and more mahogany, sanders wood, and Indian canes, than there is in all the rest of Europe, though their country produces nothing but linden-trees and willows. The happiness of the inhabitants presents a spectacle still more interesting. I never saw there a single beggar, nor a house that wanted a brick or a pane of glass. But it is the appearance of the Exchange at Amsterdam that is particularly worthy of admiration. It is an extensive structure of very simple architecture, the quadrangular court of which is surrounded with a colonnade. Each of its columns, which are very numerous, has inscribed upon its capital the name of some one of the principal cities in the world, as Constantinople, Leghorn, Canton, Petersburg, Batavia, and so forth; and is, as it were, the centre of its commerce in Europe. There are few at which business is not daily transacted to the amount of millions. Most of the people who assemble

there are dressed in brown clothes, and without ruffles. This contrast appeared the more striking to me, as five days before I was at the same hour in the Palais Royal, crowded with people dressed in clothes of the most brilliant colors, laced with gold or silver, who were conversing about the opera, literature, kept mistresses, or some other subject equally trivial, and most of whom had not a single crown in their pockets. We had with us a young tradesman of Nantes, whose affairs were deranged, and who had withdrawn to Holland, where he was an utter stranger. He had communicated his situation to my travelling companion, whose name was M. Le Breton. This gentleman was a Swiss officer in the Dutch service, partly a soldier and partly a merchant, the best-natured man in the world, who told him not to be discouraged, and gave him a recommendation to his brother, a merchant who lived in the same house at which we took lodgings. This brother of M. Le Breton took the unfortunate traveller to the Exchange, and recommended him, without compliment or humiliation, to a commercial agent who merely asked the young Frenchman for a specimen of his writing; then with a pencil he took down his name in his pocket-book, and directed him to meet him at the same place, and the same hour, the followimg day. I did not fail to accompany him and M. Le Breton. The agent appeared, and shewed my countryman a list of seven or eight merchants clerks' places to chuse from; to some was annexed a salary of eight hundred French livres, with board, and to others fourteen hundred livres without it. He thus obtained a place immediately, without any farther trouble. I asked M. Le Breton's brother, to what cause I was to ascribe the active vigilance of this agent in behalf of one who was a total stranger. He replied: "It is his trade; he receives for his trouble the first month's salary of those for whom he provides. You need not be surprised," added he; "they make a trade here of every thing, from an odd shoe to a fleet."

We must not, however, suffer ourselves to be dazzled by the illusions of an immense commerce, by which our policy has often been misled. Fabrics and manufactures, we are told bring millions into a country; but the fine wools, the dying materials, the gold and silver, and other articles which it procures of foreigners, are tributes which it is obliged to pay them. If they had none of these, the people would not the less have manufactured their native wool, and if their cloth had been of inferior quality, they could at any rate have converted it to their own use. Unlimited commerce is adapted only to a nation which has a small and barren territory, like the Dutch. They export not their own superfluities, but those of other nations; and they run no risk of wanting the necessaries of life, as is frequently the case with various territorial powers. Of what advantage is it to a nation to clothe all Europe with their wools, if they themselves go naked; to raise the best wines, if they drink nothing but water; and to export the finest flour, if they eat only bran-bread? Very frequent examples of these abuses may be found in Poland, in Spain, and in the countries which are considered as the best governed.

It is principally in agriculture that France should seek the chief means of subsistence for her inhabitants. Agriculture is, moreover, favorable to morals and to religion. It renders marriages easy, necessary, and happy. It gives birth to a great number of children, which it employs, almost before they can walk, in collecting the produce of the earth, and in tending the flocks; but it is accompanied with all these advantages only in small possessions. We have already asserted, and we cannot too often repeat, that small farms double and quadruple in a country both the crops and the cultivators. On the other hand extensive possessions convert it into vast solitudes. They excite in the bosoms of rich farmers a love of the splendor of cities, and a disgust of rural occupations. They place their daughters in convents, in order to make ladies of

them, and send their sons to college to bring them up for lawyers and abbès. They rob the children of citizens of their resources; for though the inhabitants of the country are continually intent on establishing themselves in the cities, those of the cities will never return to the country, because it is burdened with disgraceful impositions.

Great farms expose the state to another dangerous inconvenience, to which, I believe, no writer has yet paid attention. Their cultivated lands lie fallow at least once in three, frequently every two years. It must therefore happen, as in every thing that is directed by accident, that sometimes a great number of fields lie fallow at once, and at others there are but very few. Most assuredly in those years in which the greatest part of these lands are left unsown, a much smaller quantity of grain than usual must be raised in the kingdom. This inconvenience, which, as far as I know, has never engaged the attention of governments, is the cause of the unforeseen scarcity and dearth which happen from time to time, not only in France, but in the different countries of Europe. Nature has divided with man the administration of agriculture. She has reserved for herself the winds, the rains, the sun, the expansion of plants, and she takes great care to regulate the elements according to the seasons; but she has left to man the adaptions of vegetables to soils, the proportion which their culture ought to bear to the society they support, and all the other cares which their preservation, their distribution, and their police require. I think this remark of sufficient importance to demonstrate the necessity of a particular minister for agriculture. If he could not prevent the combinations of chance in the lands which may happen to lie fallow all at once, he would at least prevent the exportation of grain from the country in years when they are mostly in cultivation, since it is a positive proof that the year following their produce will be so much the less, as most of them will then be in a state of rest.

Small farms are not subject to these vicissitudes; they are productive every year, and almost in every season. Compare, as I have already said, the quantity of fruits, of roots, of vegetables, of grass, and grain raised every year, and at every time of the year, on the spot in the vicinity of Paris called the Pré Saint Gervais, the soil of which is but middling, and which is situated on the side of a hill exposed to the north, with the produce of an equal tract of land in the adjacent plains, cultivated on a large scale, and you will find a prodigious difference. There is a difference equally great in the nnmber and moral character of their cultivators. I have frequently heard a respectable ecclesiastic declare, that the former went regularly to confession every month, and that very often their confessions contained no subject for absolution. I say nothing of the infinite delight resulting from their occupations; from their beds of carnations, violets, sweet-pease, and larkspurs; from their hedge-rows of lilach and vines, which divide their little possessions, from their meadows with their glades and their groves of willows and poplars, beneath whose shade you discover, at the distance of several leagues, either mountains undulating at the horizon, or unknown castles, or the steeples of the villages in the plain, whose rustic chimes are distinctly heard. Here and there you find rills of limpid water, the source of which is covered with an arch, closed on every side with large stones, which give it the appearance of an ancient monument. On these I have sometimes read these words, written with charcoal: *Colin and Colette, March 8th, Antoinette and Bastien, May 6th.* These inscriptions gave me greater pleasure than those of the Academy. When the families which cultivate this enchanted spot are scattered with their children over its dells and its eminences, and you hear at a distance the voice of a young maiden who sings without being visible, or perceive a young man aloft in an apple-tree, with his basket and his ladder, looking this way and that, and listening like another Vertumnus; there

is not any park, with its statues, its marbles, and its bronzes that can be compared to it.

O ye rich, who are desirous of encircling your mansions with delightful parks, inclose happy villages within their walls. How many desert tracts in the kingdom might afford such a spectacle! I have seen Bretagne and other provinces covered as far as the eye could reach with moors, on which grows nothing but furze. Our agricultural societies who have there employed their great ploughs in vain, have considered them as doomed to perpetual sterility; but the ancient divisions of fields, the ruins of houses and ditches on these heaths prove that they were formerly under cultivation. They are likewise surrounded with farms, which prosper on the same soil. How many others might be made still more fertile, such as those of Bordeaux, which are covered with large pine-trees. The soil which produces a stately tree, is certainly capable of affording nourishment to an ear of corn. In treating of the vegetable order, we have stated the means of discovering the natural analogies of plants with every latitude and with every territory. There is not any soil, not even pure sand or mud, on which, through the particular bounty of Providence, some one of our domestic plants is not capable of thriving. But above all, it would be necessary to renew the woods which formerly sheltered those situations, now exposed to the action of the winds, which blight the shoots of all that is sown upon them. These means, and many others cannot be carried into effect by greedy companies, nor by the statute labour of provinces, but by the local and patient assiduity of free families, which are proprietors themselves, which are not subject to tyrants, but are dependent only on the prince. It is by these patriotic means that the Dutch have succeeded in producing oaks at Scheveling, a village near the Hague, in pure sea-sand, as I have myself seen. We repeat once more, it is not on extensive domains, but into the baskets of our vintagers and into

the aprons of our reapers, that the Almighty pours from heaven the fruits of the earth.

These extensive tracts of land, lost in the kingdom, have attracted the notice of cupidity; but a much greater quantity has escaped its attention, because it could not be converted into either marquisates or viscounties, and likewise because great ploughs were perfectly useless there. I allude, among others, to the stripes of land along the sides of the roads, which are infinitely numerous. Our highways indeed are in general productive, since they are bordered with elms. The elm is undoubtedly useful; it is employed by the cartwright; but we have a tree which is far preferable, because no insect ever attacks its wood, which is excellent for building, and because it produces abundance of nourishing fruit, I mean the chesnut. Some opinion might be formed of the durability and beauty of its wood, by the ancient structure of the market of St. Germain before it was burned; the joists were of prodigious length and thickness, and perfectly sound though they were more than four hundred years old. A proof of this may still be seen in the wood-work of the ancient castle of Marcoussi, fifteen leagues from Paris, built during the reign of Charles VI.* We have entirely neglected this tree, which is now suffered to grow only in the recesses of our forests. Yet its port is exceedingly majestic, its foliage is beautiful, and it produces such a vast quantity of fruit in stages crowded one above the other, that it is impossible for a piece of ground of the same extent, sown with wheat, to yield such an abundant crop. It is true, as we have already shown in treating of the characters of vegetables, this tree delights only in dry and elevated situations; but we have another for vallies and humid places, whose wood and whose fruit are not less useful, and whose appearance is equally majestic; that is the walnut-tree. These beautiful trees would be a magnificent

* This monarch reigned from the year 1380 to 1422. T.

ornament to our high-roads. Others might be planted along them which are calculated for every territory. They would announce to the traveller the provinces of the kingdom; the vine would indicate Burgundy; the apple-tree Normandy; the mulberry Dauphiné; the olive Provence. Their branches, laden with fruit, would determine much better than the stakes with iron rings at the top, or the tremendous gibbets of criminal justice, the limits of each province and the mild and diversified lordships of Nature.

It may be objected that passengers would gather the fruits, but they scarcely ever touch the grapes on the vines with which the high roads are sometimes bordered. And even if they were to make free with them, what great inconvenience would thence result? When the king of Prussia ordered several of the high-roads of Pomerania to be planted with fruit-trees, it was represented to him that their fruit would be stolen: "Somebody at least will be benefited by them," was his reply. Our cross roads present perhaps still more waste ground than the high-roads. If we reflect that by means of them the small towns, villages, hamlets, abbeys, castles, and even single houses communicate with each other, that there are several to conduct to the same point, and that each of them is at least as wide as a cart, we shall find that the space they occupy must be considerable. The first thing necessary to be done would be to lay them out in a straight line, for most of them wind in such a manner as to be one third longer than they ought. I must, however, confess that I think their sinuosities agreeable, especially on the brow of hills, on the declivity of mountains, in rural situations, and in the midst of forests. But they might be rendered susceptible of another species of beauty, by bordering them with fruit-trees, which grow to no great height, and which, furnishing objects of perspective, would increase the apparent extent of the country. These trees would likewise afford shade to the traveller. Farmers, indeed, assert that shade, so agreeable to the passenger, is prejudicial to their corn. This is undoubt-

edly true with respect to several species of corn; but there are some kinds which thrive betterin situations which are slightly shaded than in any others, as may be seen in the Pré Saint Gervais. Besides, the farmers would be compensated with usury by the wood of the fruit-trees, and the produce of their fruit. The interests of the farmer and of the traveller might even be reconciled by planting on both sides only such roads as run from north to south, and the south side of those that go from east to west, so that the shade of their trees would scarcely fall in the least upon the cultivated lands.

To augment the means of national subsistence, it would likewise be necessary to sow with wheat a great quantity of land which is in pasture. There are scarcely any pastures in China, which is so populous. The Chinese sow wheat and rice in every situation, and feed their cattle with their straw. They have a saying, that "it is better for the beasts to live with man, than for man to live with the beasts." Nevertheless their cattle are fat. The German horses, which are so strong, are fed only on chopped straw, mixed with a small quantity of barley or oats. Our peasants adopt from day to day customs directly contrary to this economy. They throw, as I have observed in several provinces, much land which formerly produced corn, into indifferent pasturage, to avoid the expence of cultivation, and in particular the payment of tithes, because the clergy collect none from meadows. I have seen in Lower Normandy a great quantity of land, which has been thus converted into pasturage, to the great detriment of the public welfare. The following fact was told me while inspecting a field which had undergone this metamorphisis. The rector, vexed at losing a portion of his revenue, without the possibility of complaining, said to the owner of the field, in in the way of advice: "I should think, M. Pierre, if you were to gather all the stones from that land, and manure it and plough it well, and sow it with corn, it would still yield some good crops." The cunning farmer, aware of

the intention of his decimator, replied: "You think very right, Sir; but if you will take the trouble to do all you have been mentioning to the field, I should be satisfied with a tithe of the crop."

We shall never give to our agriculture all the activity of which it is susceptible, but by restoring it to its natural dignity. For this purpose it would be necessary to prevail upon a multitude of opulent and indolent citizens, who vegetate in our small towns, to go and reside in the country. To induce them to take this step, farmers should be exempted from the humiliating impositions of the land-tax and statute-labor, and also of the militia, to which they are liable. The necessities of the state must undoubtedly be supplied; but why have characters of humiliation been attached to these services? Might not a composition be taken for them in money? A very heavy one would be required, say our politicians. Most certainly; but are not our citizens likewise burdened with numerous imposts to provide for these same services? Besides, the greater the number of inhabitants in the country, the smaller would be the portion to be paid by each. A well-bred man would much rather satisfy a demand upon his purse than upon his self-love.

By what fatal contradiction have we made the greatest part of the lands of France plebeian, whereas we have ennobled those of the new world? The same cultivator who, in France, would have to pay the poll-tax, and to go with his pick-axe on his shoulder to work on the highway, is permitted to place his children in the king's household if he is an inhabitant of the islands of America. This kind of ennobling has not been less fatal to these foreign regions, where it has introduced slavery, than to the provinces of the mother country, the cultivators of which it has robbed of a multitude of resources. Nature invited to desert America the superabundance of the European nations: she had there, with maternal attention, provided every thing to indemnify Europeans for the removal from

their country. There man has no occasion to expose himself to a scorching sun in order to reap his corn, or to the chilling frosts while attending his flocks; he has no occasion to turn up the earth with heavy ploughs to make it produce food, or to ransack its bowels for iron, stone, clay, and the primary materials for our utensils and our houses. Kind Nature has there placed on the trees, in the shade, and within the reach of the hand, all that is necessary and agreeable for human life. She has there supplied man with milk and butter in the cocoa-nut, perfumed creams in the date, table cloths and meat in the large velvet leaves and the figs of the banana, bread ready for baking in the potatoe and the root of the cassava, down finer than lamb's wool in the pots of the cotton tree, dishes of every form in the shell of the calebash. She had there provided habitations impervious to rain and to the rays of the sun, under the thick branches of the Indian fig, which shooting up toward heaven, and then descending to the earth, where they take root, form with their numerous arcades palaces of verdure. She had scattered for pleasure and for commerce, on the banks of rivers, in the bosoms of rocks, and in the beds of torrents, the maize, the sugar-cane, the cacao, the tobacco, and a multitude of other useful vegetables; and in the resemblance of the latitudes of this new world to those of different regions of the old, she promised its future inhabitants to adopt, in their favor, the coffee, the indigo, and the most valuable vegetable productions of Africa and Asia. Why has the ambition of Europe deluged these happy climates with human tears and human blood? Ah! had liberty and virtue called together their first cultivators, what charms would not French industry have added to the fertility of the soil and the happy temperature of the tropics!

Neither frost nor excessive heat is to be dreaded there: and though the sun is twice a year at the zenith in those countries, each day when he rises above the horizon, he

brings with him from the surface of the sea a refreshing breeze, which continues till evening, and cools the forests, the mountains, and the vallies. How many happy retreats would our poor soldiers and our peasants, without possessions, have found in these fortunate islands! What sums expended for garrisons would then have been saved! How many small domains would there have become the rewards of brave officers or of virtuous citizens! How many skilful seamen would there have been formed by the fishery for turtle, with which the adjacent rocks are covered, or by that of cod on the Banks of Newfoundland, which is still more abundant! It would have cost the state little more than the expence of settling the first families. With what facility they might have been successively extended, after the manner of the Caraibs from island to island, and at the expence of the community! Assuredly, had this natural course been followed, our power would at this day have extended to the very centre of the continent of America, where it would hae been completely invincible.

Pains have been taken to persuade the court that prosperity would lead our colonies to independence; and the American colonies of England are quoted in proof of this assertion. But England lost them not because she made them too happy, but, on the contrary, because she oppressed them. England, moreover, committed a great error by introducing into them too many foreigners. There exists, besides, a wide difference between the genius of the English and ours. The Englishman carries his country with him wherever he goes; if he makes a fortune in another land, he embellishes his habitation there, he introduces the manufactures of his nation, he lives and he dies there; or if he returns to his native country, he fixes his residence in the place which gave him birth. Very different are the sentiments of the French: all those I have seen in the islands look upon themselves as strangers. Though they may live twenty

years in one habitation, they will not plant a single tree before the door to procure an agreeable shade, and by their account they are all going to leave the country the next year. If they actually acquire a fortune, and sometimes even if they do not, they depart and return, not to their native province or village, but to Paris. This is not the place for investigating the cause of this national hatred for the place of their nativity, and this predeliction for the capital; it is a consequence of various moral causes, and, among the rest, of education. Be that as it may, this turn of mind is alone sufficient to prevent our colonies from ever becoming independent. The enormous expenditure required for their preservation, and the facility with which they are taken, ought to have cured us of this prejudice. They are all in a state of such imbecility, that if their commerce with their mother country were cut off for a few years, they would soon be in want of articles of the first necessity; nay, it is well worthy of remark, that not a single production of the conntry is manufactured there. The inhabitants cultivate cotton of excellent quality, but they make no cotton stuffs as in Europe; they know not even how to spin it like the savages, nor to use, as they do, the filaments of the banana, or the leaves of the palmist. Though the cocoa-tree, which constitutes the riches of the East Indies, grows in these islands, scarcely any use is made either of its fruit or of its tow. Crops of indigo are raised, but none of it is there employed for dying. Sugar, therefore, is the only article which undergoes the process of manufacture, because otherwise it would be unfit for commerce; and even then it must be refined in Europe to acquire its highest degree of perfection.

There have been, indeed, several insurrections in our colonies; but they have been much more frequent in their state of weakness than in that of their opulence. It is the bad choice of subjects who have been removed thither that has filled them with perpetual discord. How is it possible to hope that citizens who have dis-

turbed an ancient society can concur to render a new one prosperous? The Romans and the Greeks employed the flower of their youth and their best citizens to found their colonies, which became kingdoms and empires. It is the bachelors belonging to the army, the navy, the law, and every profession; it is the staff-officers so numerous and so useless, who fills ours with the passions of Europe, with a love of fashion, with vain luxury, with corrupt opinions, and with immorality. Nothing of all this could have been apprehended from our simple cultivators. Bodily labor soothes the distresses of the mind, fixes its natural restlessness, causes health, patriotism, religion, and happiness to flourish among the people. But my wish is that in process of time these colonies may be separated from France. Did Greece shed tears when her flourishing colonies carried her glory and her laws to the shores of Asia, to the coasts of the Euxine and the Mediterranean? Was she alarmed when they became the stocks whence issued mighty kingdoms and illustrious republics? Though they were separated from her, did they on that account become her enemies, and was she not, on the contrary, frequently protected by them? What great inconvenience could have arisen, if shoots from the parent-tree of France had carried her lilies into America, and had overshadowed the new world with their majestic branches?

Let us confess the truth: few individuals in the councils of kings devote their attention to the happiness of mankind. When they once turn their back on this grand object, they soon lose sight of the national prosperity, and the glory of the prince. Our politicians, who have kept our colonies in a perpetual state of dependence, agitation, and penury, have totally mistaken the character of man, who is attached to the place he inhabits only by the happiness he enjoys. But introducing into them the slavery of the Negroes, they have established a connection between them and Africa, and have broken those ties which ought to unite them with their poor countrymen. They

have likewise mistaken the character of the European, who, in a hot climate, is incessantly afraid lest his blood should be polluted, like that of his slaves, and who is even sighing for new alliances with his countrymen, that the fresh and lively colors of European blood may circulate in the veins of his grand-children, together with a love of country still more interesting. In giving them perpetually new chiefs, military and civil, magistrates who are strangers to them, who oppress them with a heavy yoke, in a word, men greedy of wealth, they have mistaken the French character, which had not occasion for these barriers to keep it in the love of country, since it every where regrets the productions, the honors, and the very disorders of that sentiment. They have therefore made of them neither colonists for America, nor patriots for France, and they have mistaken at one and the same time the interests of their nation and of their sovereign, whom they intended to serve.

I have rather enlarged on the subject of these abuses, because they are not irremediable in many respects, and there are regions of the New World in which the nature of our settlements might be changed; but this is neither the time nor the place for developing the means. After having proposed some remedies for the physical maladies of the nation, let us pass to its moral maladies, which are the source of them. The principal cause is the spirit of discord which prevails among the different orders of the state. There are two ways of correcting this; the first is, to remove the motives for discord, and the second is to increase the motives for unanimity.

Most of our writers boast of the social spirit of our nation; and foreigners actually consider it as the most sociable in Europe. Foreigners are right, for we give them the most favorable reception, and eagerly seek their company; but our writers are wrong. May I venture to speak out? It is because we have no love for our countrymen that we bestow such caresses on foreigners. For my

own part, I have observed this spirit of union either in families or in bodies, or in the natives of the same province, excepting those of a single one, which I shall not name: no sooner have they quitted it than they seek each other's society with the greatest eagerness. But, since the truth must be told, it is rather from antipathy to the other inhabitants of the kingdom, than from attachment to their countrymen; for their province has ever been notorious for internal dissensions. In general, the genuine spirit of patriotism, which is the first sentiment of humanity, is very rare in Europe, and especially in France.

Without pursuing this argument any farther let us seek proofs of it which may be comprehended by every capacity. When you read any account of the manners and customs of the Asiatic nations, you are touched with that sentiment of humanity which among them unites man to man, notwithstanding the phlegmatic silence which pervades their assemblies. If, for example, an Asiatic traveller takes his repast, his servants and his camel-driver seat themselves beside him around his table. If a stranger happens to pass by, he sits down too; and after having made an inclination of the head to the master of the family, and returned thanks to God, he continues his journey without being asked who he is, whence he comes, or whither he is going. This hospitable custom is common among the Armenians, the Georgians, the Turks, the Persians, the Siamese, the Negroes of Madagascar, and the different nations of Africa and America. In those regions man is still dear to man. If, on the contrary, you step into a tavern at Paris, where there are a dozen tables, and a dozen persons enter one after another, you see each of them take his place at a separate table, without uttering a word. If no new guests should come in, each of the twelve first would dine alone, like a Carthusian. At first profound silence reigns among them, till some silly fellow, put into a good humour by his dinner, and impelled by the necessity of communicating his sentiments, opens the

conversation. The eyes of the whole company are immediately turned towards the speaker, and examine him at a single glance from head to foot. If he has the appearance of what is called a man *comme il faut*, that is a rich man, he is suffered to proceed without interruption. He even finds flatterers, who confirm what he says, and who applaud his literary opinion, or his licentious discourse. But unless he possesses that kind of distinction, were he even to quote some sentence of Socrates, scarcely has he begun his harange, before he is interrupted by some one, who contradicts him. The observations of the latter are in their turn controverted by other wits, who enter the lists, on which the conversation becomes general and tumultuous. Sarcasms, severe expressions, perfidious double entendres, and gross abuse generally terminate the meeting; and each of the company retires highly satisfied with himself, and extremely displeased with the others. You will find the same scenes in our coffee houses, and our public walks. People frequent them to obtain admiration, and to find fault with every body else. It is not the spirit of society, but the spirit of discord which brings us together. It is still worse with what his called good company. If you would be well received there, you must pay for your dinner at the expence of the house where you supped the preceding night: and you may think yourself fortunate if you can come off with a few scandalous anecdotes, and if, to please the husband, you are not obliged to deceive him by making love to his wife.

The first source of these divisions proceeds from our education. This teaches us from our infancy to prefer ourselvrs to others, by exciting us to be the first among the companions of our studies. As this vain emulation affords no career in the world to the generality of citizens, each of them rests his preference on his province, his birth, his rank, his figure, his dress, or the saint of his parish. Hence proceed our social antipathies, and so many abusive nicknames given by the Norman to the

Gascon, by the Parisian to the native of Champagne, by the noble to the commoner, by the lawyer to the ecclesiastic, by the Jansenist to the Molinist. We prefer ourselves in particular, by opposing our own good qualities to the defects of others. For this reason it is that scandal is so easy, so agreeable, and that it is in general the moving principle of all our conversations.

A person of high rank one day, observed to me, that there was not a man living, however wretched he might be, but what we should find superior to ourselves from some advantage in which he excels us, either in youth, in health, in talents, in figure, or in some good quality, be our own perfections what they may. This observation is literally true, but this manner of viewing the members of a society is that of virtue and not our own. As the contrary maxim is equally true, our pride dwells upon the latter, and to this it is instigated by the manners of the world, and by our very education, which inculcates from our childhood the necessity of this personal preference.

Our theatrical exhibitions likewise concur to heighten among us the spirit of discord. Our most celebrated comedies in general represent tutors deceived by their pupils, fathers by their children, husbands by their wives, and masters by their servants. The spectacles of the people exhibit nearly the same pictures; and, as if they were not sufficiently inclined to disorder, they adapt to them scenes of intoxication, obscenities, robberies; they teach them to despise at once both the magistrates and morals. Spectacles assemble the bodies of the citizens, and alienate their minds.

Comedy, we are told, corrects vices by means of ridicule—*Castigat ridendo mores.* This adage is as false as many others which form the basis of our morality. Comedy teaches us to laugh at others, and nothing more. Nobody says—the portrait of that miser resembles me but each immediately discovers in it that of his neighbor Horace long ago made this remark. But if people should

even recognise themselves in such characters, I do not see that the reformation of the vice would be the consequence. Can a physician cure a patient by presenting to him a looking-glass, and turning him into ridicule? If my vices are laughed at, the ridicule of others, so far from weaning me, plunges me still deeper into them: I strive to conceal them; I become a hypocrite. Ridicule, too, is much oftener applied to virtue than to vice. It is not the faithless wife, or the youthful libertine, that we laugh at, but the easy husband and the indulgent father. To justify this propensity, we adduce the taste of the Greeks; but we forget that their vain spectacles drew the public attention to frivolous objects, that the virtue of the most illustrious citizens was frequently turned into ridicule in those exhibitions, and that they strengthened those antipathies and jealousies which accelerated their ruin.

I would not have it supposed that I censure laughter, and believe, with Hobbes, that it is the offspring of pride, Children laugh, and assuredly it is not from pride. They laugh at the sight of a flower, at the sound of a bell. We laugh from joy, content, happiness. But ridicule is very different from natural laughter. It is not, like the latter, the effect of some agreeable harmony in our sensations and in our sentiments. But it arises from the clashing contrast of two objects, one of which is great and the other small, one of which is strong and the other weak. It is very remarkable that it is produced by the same oppositions that produce terror, with this difference, that in ridicule the mind passes from a terrific to a frivolous object, and in terror from a frivolous to a terrific object. The asp of Cleopatra in a basket of fruit; the hand writing Belshazzar's doom in the midst of a banquet; the tolling of the bell announcing the death of Clarissa; the print of the foot of a savage in the sandy beach of a desert island, strike greater terror into the imagination than all the apparatus of battles, executions, banditti, and death. To impress the mind with profound terror, it is therefore

necessary first to present a frivolous and apparently insignificant object, and if you would powerfully excite ridicule, you must set out with an imposing idea. You may add to it some other contrast, as that of surprise, and some of those sentiments which convey us into infinity, as that of mystery; then the mind, having lost its equilibrium, plunges into terror or into laughter, according to the precipice which has been prepared for it. We frequently see these contrary effects produced by the same means. For example, if a nurse would set a child a laughing, she covers her head with her apron, and the child immediately becomes serious; she then suddenly throws aside the covering, and it begins to laugh. If she wants to frighten it, which is but too frequently the case, she first smiles, and the child smiles at her: she then assumes all at once a serious look, or covers her face and the child falls a crying. I shall say no more concerning these violent oppositions; but shall only deduce from them this consequence, that it is the most unhappy nations which have the strongest propensity to ridicule. Affrighted by political and moral phantoms, they first seek to divest themselves of respect for them, and this they very easily effect, since nature, aiding the oppressed, has placed in most things of human institution the sources of ridicule beside those of terror. They have nothing to do but to reverse the objects of their comparison. It was thus that Aristophanes overturned the religion of his country, by his comedy of the Clouds. Look at school-boys; they first tremble before their master; the first thing they do to familiarize themselves to the idea of him is to turn him into ridicule, and in this they are generally very successful. The love of ridicule is not, then, a sign of the happiness of a people, but a proof of its wretchedness. For this reason the ancient Romans were so grave when they were happy, and their descendants, who are so miserable, are celebrated for their pasquinades and supply all Europe with harlequins and comedians.

I cannot deny that exhibitions, such as tragedies, are capable of uniting the citizens. The Greeks frequently employed them for this purpose: but while we adopt their dramas, we relinquish their intention. It was not the miseries of other nations that they represented on their stage, but those they had themselves undergone, and events taken from their own history. Our tragedies fill us with a foreign compassion. We weep over the misfortunes of the family of Agamemnon, and we behold with dry eyes the wretched at our own doors. We do not even perceive their distresses, since they are not represented on the stage. Yet our heroes ably represented, would be sufficient to heighten the patriotism of the people into enthusiasm. What crowds have been drawn together by the Siege of Calais, and what applauses have been bestowed on the heroism of Eustace de St. Pierre! The death of Joan of Arc would likewise produce a powerful effect, if some man of genius durst efface the ridicule heaped by us on that respectable and unfortunate female, to whom Greece would have erected altars.

I shall here state my ideas in a few words to excite in some virtuous man the inclination to do what I have suggested. It is my wish, then, that without departing from historic truth, she should be represented as honored with the favor of her sovereign, the applause of the army, at the height of her glory deliberating about returning to her hamlet, to live there as a simple shepherdess, obscure and unknown. At the solicitation of Dunois she determines to expose herself to new dangers for the love of her country. At length, taken prisoner in an engagement, she falls into the hands of the English Interrogated by her inhuman judges, among whom are bishops of her own nation, the simplicity and the innocence of her replies render her victorious over the insidious questions of her enemies. She is condemned by them to perpetual imprisonment. Let the spectator be shewn the dungeon in which she was doomed to pass the remainder of her

wretched life, with its long air-holes, it iron bars, its thick vaults, the wretched couch on which she lay, the pitcher of water, and the black bread that were to serve for her food; let him hear her touching reflexions on the nothingness of grandeur, her simple lamentations over the felicity of a country life, her renewed hopes of relief from her sovereign, and her despair at the sight of the horrible abyss which has closed upon her. Let him then see the snare laid for her while asleep by her perfidious enemies, who placed beside her the arms with which she had fought. She perceives, on her awaking, these monuments of her glory. Impelled by the propensity of a woman, and at the same time of a hero, she covers her head with the helmet, whose plume had shewn to the discomfited French army the way to victory: she grasps the sword, once so formidable to the English, in her feeble hands, and at the moment when the sense of her glory causes tears of joy to flow from her eyes, her dastardly enemies suddenly make their appearance, and condemn her to the most horrible of deaths! 'Tis then a spectacle worthy the attention of heaven itself would be exhibited, virtue struggling with extreme misery; you would hear her heart-rending lamentations on the indifference of her sovereign, whom she has so nobly served; you would behold her anguish at the idea of the dreadful fate which awaits her, and still more at the apprehension of the calumny which must for ever tarnish her memory; you would hear her in these terrible conflicts doubt the existence of a Providence to protect the innocent. She is however obliged to march forth to die; and it is at this moment I should wish to see all her courage revive. I would have her represented on the pile on which she expired, despising the vain hopes which the world affords to those who serve it, representing to herself the everlasting disgrace with which her death will cover her enemies, the immortal glory which will for ever confer lustre on the place of her birth, and even on that of her execu-

tion. I should wish her last words, animated by religion, to be more sublime than those of Dido, when she exclaims on the funeral pile.

Exoriare aliquis nostris ex ossibus ultor.

In a word, it is my wish that a patriotic piece should be produced from this subject, treated by a man of genius after the manner of Shakspeare, who certainly would not have neglected to avail himself of it, had Joan of Arc been a native of England; and that this illustrious shepherdess should become among us the patroness of war, as St. Genevieve is of peace; that this drama should be reserved for the perilous circumstances in which the state may chance to be involved; that should then be represented to the people, as the standard of Mahomet is exhibited in similar cases at Constantinople; and I doubt not that, at the sight of her innocence, her services, her misfortunes, the cruelty of her enemies, and her horrid fate, our enraged countrymen would exclaim: "War, war with the English!"*

These means, though more powerful than military force, and recruiting by violence or by artifice, which is employed to procure soldiers are still insufficient for making real citizens. They accustom us to love our country, and to love virtue, only when their heroes are applauded on the stage. Hence it is that the majority even of persons who have received a good education, are incapable of appreciating an action, unless they read the relation of it in some journal, or see it made the subject of a dramatic exhibition. They form their judgment of it not from their

* God forbid that I should excite in the bosoms of our countrymen a hatred of the English, who are now so deserving of our highest esteem! But as their writers, and even their government, have more than once taken the liberty to make us odious on the theatres of their nation, I was willing to shew them how easy it is for us to make reprisals. May rather the genius of Fenelon, which they entertain such respect that one of their most amiable writers, Lord Lyttelton, has placed it above that of Plato, one day closely unite our heart and minds!

own hearts, but from the opinion of others, not from the reality, but from the image. They love heroes who are applauded, powdered and perfumed; but if they see them shedding their blood in an obscure place, and perishing ignominiously, they know them not. Every one would be the Alexander of the Opera, but no person would be that of the city of the Mallii.

Patriotism must not be too often represented on the stage. It is necessary that there should be heroes who submit to death without obtaining celebrity. To put the people into the path of Nature and of virtue with regard to this point, they ought to serve as a spectacle to themselves. They ought to be shewn realities, and not fictions; they should behold soldiers, and not comedians, and if it be not possible to exhibit to them the dreadful spectacle of a battle, they ought at least to see the necessary manœuvres and preparations in the military festivals.

The soldiers should be more closely connected with the nation, and their condition rendered more comfortable. They are but too often the occasion of disputes in the provinces through which they pass. The *esprit de corps* animates them to such a degree, that when two regiments happen to be quartered in the same town, a number of duels are almost always the consequence. These ferocious antipathies are totally unknown in the Prussian and Russian regiments, whom I consider, in many respects, the best troops in Europe. The king of Prussia has inspired his soldiers not with attachment to a particular body, which divides them, but with an attachment to their country, which unites them. This he has effected by bestowing most of the civil offices of his kingdom as the reward of military services. Such are the political ties which bind them to their country. The Russians employ only one, but it is still stronger; I mean religion. A Russian soldier thinks that to serve his sovereign is to serve God. He marches to battle like a convert to martyrdom; and he is persuaded that if he falls, his spirit is instantly conveyed to Paradise

I have heard M. de Villebois, master of the ordnance o Russia, relate that most of the soldiers of his regiment who were stationed at a battery in the battle of Zorndorff, having been killed, the survivors, seeing the Prussians coming up with bayonets fixed, being unable to defend themselves, and determined not to fly, clung to their cannon, and suffered themselves to be massacred, that they might be faithful to the oath they are obliged to take on receiving their artillery, which is, never to abandon their guns. A resistance so obstinate deprived the Prussians of the victory they had gained, and caused the king of Prussia to observe, that it was easier to kill the Russians than to conquer them. This heroic constancy proceeds from religion. It would be extremely difficult to introduce this principle among the French troops, composed, in part, of the dissolute youth of our towns. The Prussian and Russian soldiers are taken from the class of peasants, and they glory in their condition. Among us, on the contrary, a peasant is afraid lest his son should be drawn for the army. The administration contributes on its part, to fill him with apprehension. If there is a bad subject in a village, the constable contrives to make the black billet to fall upon him, as if a regiment were a galley. On this subject I wrote a memoir for the purpose of correcting those inconveniences, and for preventing desertion among our soldiers; but it produced as little effect as a great many others. The principal means of reform which I suggested in it were to improve the condition of our soldiers, as in Prussia, by the hope of civil offices, which among us are infinitely numerous; and to prevent the irregularities arising from a life of celibacy, I proposed to permit them to marry, like most of the Prussian and Russian soldiers.* This method, so well adapted to the re-

I shou d likewise advise that the wives of seamen be permitted to embark with their husbands; they would prevent disorders of more than one kind on board of ships. They would besides find in them many occupations suitable to their sex, such as cooking, washing, mending the sails, and so forth. They would frequently assist the crew in their labors. They

formation of morals, would contribute to unite our provinces, by the marriages which our regiments, which are continually passing through them, would contract. They would strengthen the bonds of the nation from north to south; and our peasants would cease to be afraid of soldiers, if they saw them passing through their provinces as fathers of families. If our soldiers are sometimes guilty of disorders, it is our military institutions that are to blame. I have seen troops that are better disciplined but I know of none more generous. I once witnessed an act of humanity on their part, of which I doubt whether many foreign soldiers would have been susceptible. It was in 1760, in our army, which was at that time in the enemy's country, encamped near a small town called Stadtberg. I lay in a miserable village, occupied by our head-quarters. In the poor cottage where I lodged with two of my comrades, were five or six women, and as many children, who had taken refuge there, and had nothing to eat; for our army had carried off their corn for forage, and cut down their fruit-trees. We gave them, it .s true, a portion of our provisions; but this was a trifling relief compared to their number and their wants. Among them was a young woman who was pregnant, and had three or four children. I saw her go out every morning, and return in a few hours with her apron quite full of slices of brown bread. She strung them on pieces of packthread, and dried them before the fire. One day I directed one of my servants, who understood German, to ask her where she obtained such large supplies, and why she prepared them in that manner. She replied that she went into the camp to ask charity of the soldiers, that each of

resist the attacks of the scurvy, and many diseases better than men. The plan of embarking women will undoubtedly appear extraordinary to those who know not that there are at least ten thousand women engaged in the navigation of the coasting vessels of Holland, who assist in working and steering the ships as well as men. One pretty woman would undoubtedly occasion disorder on board a French ship; but women of that description, robust and laborious, are proper, on the contrary, for suppressing such irregularities as are but too frequent in them.

them gave her a slice of his loaf, and that she dried the bread to make it keep, as she knew not where to procure any other provision after our departure, the whole country having been laid waste.

The state of a soldier is a perpetual exercise of virtue, in consequence of the necessity it imposes of enduring a great number of privations, and of frequently exposing his life. Religion is therefore its principal support. The Russians preserve the spirit of it among their national troops by refusing to admit any foreign soldier into their number. The king of Prussia, on the contrary, has attained the same end by receiving into his army soldiers of all religions; but he obliges each of them to follow rigidly that which he has adopted. I have seen at Berlin and at Potzdam, the officers every Sunday assembling the soldiers on the parade at eleven in the forenoon, and leading them, in order, in separate detachments, Catholics, Calvanists, and Lutherans, each to their own church, to attend divine service.

I wish that among us those causes of dissension were removed which compel one citizen, in order to live himself, to wish for the misfortune or death of another. Our politicians have multiplied these means of hatred to infinity, and they have even made the state an accomplice in these cruel sentiments, by the establishment of lotteries, tontines, and life annuities. "So many persons have died this year," say they; "the state has gained so much." If a pestilence were to break out, and sweep away one hal. of the citizens, the state would be very rich! Man is nothing in their opinion, and gold is every thing. Their art consists in reforming the vices of society, by injuries committed against Nature; and it is not a little remarkable that they pretend to act after her example. "It is her will," say they, "that every species of being should subsist only by the destruction of the other species. Individual misery is productive of general happiness." With these false and barbarous maxims are princes led

astray. These laws exist not in Nature, unless between contrary and hostile species. They exist not in the same species of animals which live in society. Assuredly the death of a bee was never productive of advantage to the hive. Still less can the misfortunes and death of a man be of benefit to his nation and to mankind, whose perfect felicity consists only in complete harmony between its members. We have elsewhere proved that the slightest evil cannot happen to a single individual without being felt by the whole political body. The rich doubt not that the property of the lower classes is transferred to them, since they enjoy the productions of their arts; but they likewise participate in their evils, though they have others peculiar to themselves. They are not only the victims of their epidemical diseases, and of their depredations, but likewise of their moral opinions, which become depraved in the bosom of the miserable. They rise up like the evils which issued from Pandora's box, forcing their way into fortresses and castles; in spite of the armed guards by which they are defended, they penetrate into the very hearts of tyrants. Whatever precaution they may take to secure themselves, they reach their neighbors, their servants, their children, their wives, and compel them to abstain from every pleasure in the midst of their enjoyments.

But when, in society, certain bodies constantly turn to their advantage the misfortunes of others, they perpetuate these misfortunes, and multiply them to infinity. It is a circumstance very easy to be observed, that wherever there are a great many lawyers and physicians, law-suits and diseases are more frequent than elsewhere. Though there are among them men of sound understandings, yet they make no opposition to irregularities, which are of advantage to their respective professions.

These evils are not without remedy: I have to quote on this subject examples that admit of no reply. When I entered into the Russian service, my pay was stopped for

the first month, for the purpose of defraying the expence of illness of every kind, with which either myself, my servants, or my family, if I were to marry, might have been afflicted. In this amount was comprehended the charge both of the physician, the surgeon, and the apothecary. A small sum, amounting to one or one and a half per cent. was likewise retained for the same purpose out of my pay. This I should have paid every year; and every time I was promoted, I should have given the first month's pay of the rank to which I had attained. This is the tax levied upon the officers, by means of which they and their families receive medical attendance in any kind of ailment which they may happen to have. From these funds the physicians and surgeons of each corps receive very handsome salaries. I recollect that the physician of the corps in which I served had a salary of one thousand rubles, or five thousand livres, and very little to do; for as our sicknesses produced him no profit, they were but of short duration. With respect to the common soldiers, they receive medical attendance, I believe, without any deduction from their pay. The medical establishment belongs to the emperor. It is at Moscow in a superb structure. The medicines are kept in vases of porcelain, and are always chosen of good quality. From this place they are disbuted over the rest of the empire, at a low price, for the benefit of the crown. No mistakes need ever be apprehended. The persons who prepare and distribute them are skilful men, who have no interest in adulterating them, and who, rising gradually in rank and salary, know no other emulation than that of fulfilling well their duties.*

* The thirst of gold and desire of luxury might be diminished in most of the citizens by setting before them a great number of these political perspectives. They constitute the charm of low conditions, by presenting to them the attractions of infinity, the sentiment of which, as we have seen, is natural to the human heart. By these the artisan and the petty shopkeeper are much more strongly attached, by moderate profits, to their low conditions, replete with hopes, than are the rich and the great to conditions of which they see the limits. The imaginations of the low are engaged nearly in the same manner as the milk-maid's in the fable. With

We might imitate Peter the Great, and not only extend to the whole kingdom the regulation which he established among his troops with respect to physicians and apothecaries, which would produce a considerable revenue to the state, but it might likewise be adopted with regard to the gentlemen of the law. It were to be wished that the attornies, the counsel, and the judges were paid by the state, and distributed throughout the kingdom, not to plead causes, but to refer them. These consonances might be extended to all the conditions which subsist by the public misery; in which case, all the citizens, finding their repose and their fortune in the welfare of the state, would contribute with all their power to maintain it.

These causes and many others divide among us all the classes of the nation. There is not a province, town, or village, but what distinguishes the next province, town, or village by some opprobrious nick-name. The same is the case with respect to conditions and professions. *Divide et impera*, say our modern politicians. This maxim ruined Italy where it originated. The more the citizens are united, the more powerful and the more happy is the nation they compose. At Rome, at Sparta, at Athens, a citizen was, at one and the same time, a lawyer, a senator, a pontiff, an edile, a farmer, a soldier, and even a mariner. See to what a degree of power those republics attained. Their citizens, however, were far inferior to ours in point of knowledge; but they learned two grand sciences of which we are ignorant, to love the gods and their country. With these sublime sentiments they were fit for every thing. Notwithstanding our universal knowledge, a great man among us would be, even in talents, but the fourth

this milk I shall buy eggs; the eggs will become chickens; the chickens will grow up into fowls; with the money for the fowls I will buy a lamb, &c. The pleasure they derive from these endless progressions is the charm which supports them under their labour; and it is so real that when they have acquired a fortune, and retired from business, their health declines, and most of them die of melancholy and languor. Ye modern politicians, approach then to Nature. It is not flutes of gold and silver that yield the sweetest tones, but those which are made of reeds

part of a Greek or a Roman. He would make great exertions for his society or his profession, but would do little for his country. It is our faulty political constitution which produces in the state so many different centres. There was a time when we talked of being republicans. Most assuredly if we were without a king, we should live in perpetual discord. Nay, how many kings do we not make under one sole and legitimate monarch! Every society has its own, who is not the head of the nation. How many projects are made and defeated in the the name of the king! The king of waters and forests opposes the king of bridges and highways. The king of colonies forms plans, and the king of finances refuses to furnish money. Amid these conflicts of the same authority, nothing is executed. The real king, the king of the people, is not served. The same spirit of discord reigns in the religion of the Europeans. What mischief have they committed in the name of God! All of them indeed, acknowledge the same God who created heaven, earth, and mankind; but each kingdom has its own, whom men are obliged to worship according to a certain ritual. It is this God to whom each nation returns thanks after every battle. 'Twas in his name that the wretched Americans were exterminated. The God of Europe is a god highly terrible and highly honoured. But where are altars of the God of peace, of the father of men, of Him whom the Gospel announces? Let modern politicians congratulate themselves on the fruits of these dissensions, and of our ambitious educations. Human life, so short and so miserable, is spent in these perpetual troubles; and while the historians of each nation, who are liberally paid, extol to the skies the victories of their kings and of their pontiffs, the people address themselves with tears to the God of the human race, enquiring which is the path they must pursue to direct their steps towards him, and to live happy and virtuous on the earth.

I repeat it, the cause of our evils proceeds from our education, replete with vanity, and from the wretchedness

of the people, which imparts a powerfull influence to al new opinions, because they always expect from novelty some relief for their former woes. But when they perceive that these opinions become tyrannical in their turn, they immediately abandon them, and hence the origin of their inconstancy. When they shall procure an easy and abundant subsistence, they will not be subject to those vicissitudes, as we have seen in the example of the Dutch, who print and sell the theological, political, and literary disputes of all Europe, which, however, have not the smallest influence over their opinions, civil or religious; and when public education shall be reformed, they will enjoy the happy and constant tranquillity of the nations of Asia.

While we are hazarding some idea on this subject, we shall propose some other means of reunion. I shall be sufficiently repaid for my investigation, if but a single one of them should be adopted.

OF PARIS.

We have already observed that few Frenchmen are attached to their birth-place. Most of those who acquire a fortune in foreign countries, come to reside at Paris. This in fact is not a misfortune for the state. The less they are attached to the place of their nativity, the more easy it is to establish them at Paris. In a great nation there ought to be one single point of reunion. All the nations celebrated for their patriotism have fixed the centre of it at their metropolis, and often of some monument of that metropolis; the Jews at Jerusalem and at their Temple; the Romans at Rome, and at their Capital; the Lacedemonians at Sparta, and in their fellow-citizens.

I love Paris:—next to the country, and a country to my fancy, I prefer Paris to every place I have seen in the world. I love that city not only for its happy situation, because all the conveniences of life are assembled there, because it is the centre of all the powers of the kingdom, and for the other reasons which gained it the attachment

of Michel Montaigne; but because it is the asylum and the refuge of the unhappy. There the ambitions, the prejudices, the animosities, and the tyrannies of the provinces are lost and annihilated. There you are permitted to live obscure and free. There you may be poor without being despised. The afflicted man is there diverted by the public gaiety, and the weak feels himself fortified with the strength of the multitude. There was a time when, on the faith of our political writers, I thought this city too large. But now I am far from thinking it sufficiently extensive and majestic for the capital of such a flourishing empire. I should wish that, excepting our sea-ports, there was not another city in France, that our provinces were covered only with hamlets and villages; and that, as there is but one centre to the state, so there should be but one capital. Would to God that it were the capital of all Europe, of the whole world; and that as people of all nations bring thither their industry, their passions, their wants, and their miseries, it might bestow on them in fortune, in pleasure, in virtue, and sublime consolation, the recompence of the asylum which they come to seek.

Most assuredly our understanding, though at the present day so enlightened, is inferior in grandeur to that of our ancestors. With their simple and Gothic manners, they, in my opinion, cherished the idea of making it the capital of Europe. Look at the traces of this plan in the names which they gave to most of their establishments; the Scotch College, the Irish College, the College of the Four Nations; and in the foreign names of the companies of the light horse. Look at that grand monument Notre Dame, built more than six hundred years ago, at a time when Paris contained not one fourth of its present population; it is more capacious and extensive than any other of the kind that has since been erected. I wish the spirit of Philip Augustus, a prince too little known in our frivolous age, still presided over its establishments, and extended the advantages of them to all nations. Not but

that natives of every other country are welcome for their money: our very enemies may live there undisturbed, provided they are rich; but above all, I would render the city just and kind to her own children. I know not that a Frenchman derives the least advantage from being born within its walls, unless it be that when he is poor he is allowed to expire in some one of its hospitals. Rome conferred many other privileges on her citizens; the meanest of them enjoyed more rights and honors than even the kings who were in alliance with the republic.

It is pleasures that draw the greatest number of foreigners to Paris; and those vain pleasures, if we examine their source, originate in the misery of the people, and the low price at which women of pleasure, spectacles, articles of fashion, and other productions of luxury may be procured. These means have been highly extolled by our modern politicians. I cannot deny that they bring considerable sums of money into the country, but, in time, the neighboring nations imitate them; the money of foreigners find its way thither, but their immorality is left behind. See what has become of Venice, with its glasses, its pomatums, its courtezans, its masquerades, and its carnival. The frivolous arts of which we boast, were borrowed from Italy, and they now constitute its weakness and its misery,

The most beautiful spectacle that a government is capable of affording, is that of a laborious, industrious, and contented people. We are taught to read in books, in pictures, in algebra, in heraldry, and not in men. Connoisseurs admire a head of a Savoyard painted by Grèuze; but the Savoyard himself is walking to and fro at the corner of the street, half frozen, and no one takes notice of him. That mother with her little children forms a charming groupe; the picture is invaluable; the original is in the next garret, and has not a penny in the world. Philosophers, you are justly enraptured, when contemplating families of birds, of fishes, and of quadrupeds, whose

instincts are so varied, and to whom the same sun imparts life. Examine the families of men composing the inhabitants of this capital; you would say that each of them had borrowed its manners and its industry from some species of animal, so different are their occupations. Observe in these plains at the entrance of the city, that general officer, mounted on a stately charger; he is exercising his troops; look at the heads, the shoulders, and the feet of his men, placed in the same line; all of them have but one look and one motion. He gives a signal, and instantly a thousand bayonets start forth; he gives another, and a thousand fires flash from this rampart of iron. You would think, from their precision, that a single fire had issued from a single musket. He gallops round those regiments covered with smoke, to the sound of drums and fifes; you would say it was the eagle of Jove, bearing his lightnings and hovering around Etna. A hundred paces off is an insect among the men. Look at that little chimney-sweeper, of the color of smoke, with his lantern, his cymbal, and his leather knee-pieces; he resembles a scarabeus. Like the insect which, in Surinam, is called the lantern-fly, he shines in the night. That child, those soldiers, that general are all men alike; and while birth, pride, and necessity establish the widest differences among them, religion makes them equal: it abases the head of the great, by shewing them the vanity of their power, and it raises that of the unfortunate, by presenting to them immortal hopes. Thus it reduces all men to the equality which Nature had established at their birth, and which society had broken.

Our Sybarites imagine that they have exhausted the whole circle of pleasures. Our melancholy old men consider themselves as unserviceable to the world: they see before them no other prospect than death. Ah! Paradise and life may still be enjoyed on earth by those who know how to do good.

If I had been in the least degree entitled to the epithet

of rich, I should have procured myself a thousand new enjoyments. Paris would have become to me another Memphis. Its immense population is unknown to us. I should have had a small apartment in one of its suburbs, near the quarries, another at the opposite extremity on the banks of the Seine, in a house shaded by willows and poplars; another in one of the most frequented streets; a fourth at a gardener's, in a house surrounded with apricot-trees, with fig-trees, cabbages, and lettuces; a fifth in the avenues to the city, at a vine-dresser's.

It is undoubtedly easy to find lodgings of this kind every where at a low price; but it is not so easy to find landlords and neighbors who are honest people. There is much corruption among the lower classes, but there are various means of discovering good people among them; and it is with this that I commence my search of pleasure. Like a new Diogenes, I set out to look for men. As I seek only the unfortunate, I have no necessity for a lantern. I rise at the dawn of day, and I repair to early mass, in a church which is still illumined only by the twilight. I there find a number of poor people, assembled to pray to God to bless their labors. Piety, unawed by human respect, is a positive proof of probity; and love of labor is another. I perceive in cold and rainy weather a whole family lying on the ground, and weeding a garden;* these are good people. Night itself is not capable of concealing virtue. At midnight, the glimmer of a lamp through the casement of a garret, announces to me some poor widow, who prolongs her labors to support her infants who are sleeping round her. These shall be my

* In general, those who are engaged in the cultivation of the earth are honest people. Plants carry their theology along with them. One day, however, I met with a reaper who was an atheist. He had not, it is true, borrowed his opinion from the fields, but from books. He appeared perfectly satisfied with the extent of his knowledge. On leaving him, I said to him: "You have done great things to have employed the researches of your reason in rendering yourself miserable."

In the subjoined examples there is scarcely any thing of my own invention, excepting the good which I never did.

neighbors and my hosts. I announce myself to them as a passenger, as a stranger who is seeking a lodging in that part of the town. I request them to give me a portion of their's, or to seek one for me in the neighborhood. I offer a good price, and am fixed at once.

I take good care not to give money, or any thing by way of charity, to these honest people, in order to gain their affections; I have much more honourable methods of winning their friendship. I charge them to ay in a larger supply of provisions than I want, and the superfluity is theirs; I pay their children for any little services they render me; on a holiday I take out the whole family into the fields to dine with me on the grass; the father and mother return home at night loaded with victuals for the rest of the week. At the approach of winter I clothe their children with woollen stuffs; their little members bless me, because my superb gifts have not frozen their hearts. It was the godfather of the youngest brother who made them a present of their clothes. The less you strain the bonds of gratitude, the stronger they are.

I not only enjoy the pleasure of doing good, and of doing it seasonably, but I likewise procure myself amusement and instruction. We admire in our books the works of artisans; but our books rob us of half our pleasure, and stifle the gratitude we owe them. They separate us from the people, and deceive us by exhibiting the arts with great apparatus and in a false light, like objects on a stage, or in a magic lantern. Besides, there is more knowledge in the head of an artisan than in his art, and more intelligence in his hands than in the language of the writer who translates him. Objects carry their expression with them: *rem verba sequuntur.* The man of the lower order has moreover a manner of observing and of feeling which is not indifferent. While the philosopher soars as high as possible into the clouds, he keeps at the bottom of the valley, and sees very different prospects in the

world. Misfortune forms him, in time, just like any other person. His language becomes pure with years; and I have frequently remarked, that there is very little difference in point of justness, perspicuity, and simplicity, between the expressions of an aged peasant, and those of an old courtier. Time effaces from their languages and their manners the rusticity and the delicacy which society had introduced into them. Old age, like infancy, places all men upon a level, and restores them to Nature. In one of my encampments, I have a host who has circumnavigated the globe. He has been a sailor, a soldier, a freebooter He is circumspect as Ulysses, but much more sincere. When I make him sit down with me at table, and he has tasted my wine, he relates to me his adventures. His memory is stored with anecdote. How many chances has he not lost of making his fortune! He is another Fernand Mèndez Pinto. However, he has a good wife, and he lives contented.

In another lodging I have a host whose life has been totally different; he has scarcely ever been out of Paris, and seldom stirs even out of his shop. Though he has not wandered over the world, he has not been the less miserable. He was once in good circumstances; he had amassed by his industry fifty double louis-d'ors, when one night his wife and his daughter ran away with his treasure. It was with difficulty he survived the shock. He thinks no more of it, he says, and his tears still flow while he speaks. I strive to comfort him; I give him employment: he seeks by labor to dissipate his grief. His industry amuses me; I sometimes pass whole hours in watching him drill and turn pieces of oak, as hard as ivory.

I sometimes stop, in the heart of the city, before the shop of a blacksmith, like Lichès, the Lacedæmonian, at Tegea, and look at him forging and striking the iron. When this man observes me attentive to his work, I shall soon obtain his confidence. I repair not, like Liches, to

the tomb of Orestes;* but I have occasion for the art o. a blacksmith, if not for myself, at least for others. I give him an order for various household utensils, of which I intend to make a monument to preserve my memory in some poor family. I likewise wish to acquire the friendship of the mechanic; I am well assured that the attention I pay to his work will induce him to exert all his skill. Thus I shall kill two birds with one stone. A rich man, in a similar case, would bestow alms, and oblige nobody. "One day," said J. J. Rousseau to me on this subject, "I was at a gentleman's house in a village near Paris, at the time of the fair. After dinner the company walked out to see the fair, and amused themselves with throwing money to the peasants, to enjoy the pleasure of seeing them scramble for it. For my part, following my solitary humour, I walked by myself. I observed a little girl who had apples to sell on a basket which she carried before her. She might praise her fruit as much as she pleased, she could find no more customers for it. "What do you ask for all your apples?" said I to her. "All my apples?" replied she, at the same time calculating to herself how much they would come to. "Sixpence, Sir," said she. "I will take them" said I, "at that price, on condition that you will go and distribute them among the little Savoyards you see yonder," which she immediately did. The children were highly delighted with the treat, and so was the little girl with having sold off all her merchandize. I should have conferred on them much less pleasure had I given them money. All parties were gratified, without any being humbled." It is a great art to do good well. Religion teaches us the secret, by enjoining us to treat others as we would be treated ourselves.

Sometimes I sally forth upon the high road, like the ancient patriarchs, to welcome to the city strangers, who

* See Herodotus, Book I.

are proceeding thither. I recollect the time when I was myself a traveller, far from my native country, and the kind reception I experienced from strangers. I have frequently heard nobles of Poland and Germany complain of our great men When they visit their countries, they are continually giving entertainments; but when in their turn, they come to France, they are totally neglected. They receive a dinner on their arrival, and another at their departure; and these are the limits of their hospitality. For my part, as it is not in my power to give them such a reception as they gave me, I acquit myself towards their countrymen. I observe a German travelling on foot: I persuade him to come and take a night's lodging with me. A good supper and good wine render him disposed to relate to me the object of his journey. He is an officer; he has been in the Prussian and Russian service; he has seen the partition of Poland. I interrupt him to enquire after Marechal de Munich, the generals de Villebois and du Bosquet, Count de Munchio, my friend M. de Taubenheim, and Prince Xatorinski, formerly marechal of the Polish confederacy, whose prisoner I was. "Most of them are dead," says he; "the others have grown old, and have retired from public affairs." "O!" exclaim I, "how melancholy it is to travel in foreign countries, and there to become acquainted with worthy men whom we are destined never to see again! O! what a rapid career is life! Happy he who can employ it in doing good!" My guest relates to me a part of his adventures, to which I pay the greatest attention, from their resemblance to my own. He has sought only to deserve well of mankind, and has been calumniated and persecuted by them. He is unfortunate; he is come to France to throw himself under the protection of the queen; he cherishes great hopes of her favor. I strengthen these hopes by the idea which the public opinion has given me of the character of the princess, and by that which Nature has stamped upon her features. He tells me that I open his heart to

consolation. He siezes my hand with deep emotion. My reception is a favorable omen to him; he would not have met with such a one in his own country. O! what acute anguish may be allayed by a single word, and by a feeble token of benevolence!

I recollect that one day I found near the gate of Chaillot, at the entrance into the Elysian Fields, a young woman, seated with an infant on her lap on the brink of a ditch. She was handsome, if that epithet may be applied to a woman overwhelmed with melancholy. I went into the lonely alley where she was, and she had scarcely perceived me, before she turned her eyes another way; her timidity and her modesty rivetted mine upon her. I remarked that her clothes were very decent and very clean; but her gown and her neck-handkerchief were so full of darns, you would have said that spiders had woven the stuff of which they were made. I approached her with that respect which is due to the unfortunate; I saluted her first, and she returned my salutation with civility, but with coldness. I then endeavoured to draw her into conversation, by talking of the weather: she replied only by monosyllables. I then asked her if she had been taking a walk in the fields, on which she began to sob and to weep without saying a word. I sat down by her, and urged her with all possible circumspection to acquaint me with the subject of her distress. "Sir," said she, "my husband has failed at Paris for five thousand livres; I have been accompanying him as far as Neuilly; he has undertaken, on foot, a journey of sixty leagues, to collect a little money that is owing us. I have given him my rings and all I had to support him during his journey, and have nothing left but twenty-four sous to maintain myself and my child." "To what parish do you belong, madam?" asked I. "To St. Eustace," she replied. "The rector," I rejoined, "is accounted a very charitable man." "Yes, Sir," said she; "but you must know that parishes have no charity for us wretched Jews." At these words

her tears flowed still faster, and she rose to continue her way. I offered her a very trifling relief, which I requested her to accept as a proof at least of my good will. She did accept it, and made me more curtsies and loaded me with more thanks and benedictions than if I had retrieved her affairs. What delicious pleasures would that man enjoy who should spend in this manner ten thousand livres a year!

My different establishments, scattered over the capital and its vicinity, render my life highly varied and agreeable. In winter I fix my quarters in that which is fully exposed to the mid-day sun; in summer I occupy one to the north, on the banks of the river; another time I encamp in the neighborhood of the street d'Artois, among the heaps of free-stone, and observe palaces, pediments with sphynxes, domes, and kiosks rising around me. I take good care not to enquire who are the masters of them: ignorance is the mother of pleasures and of admiration. I am in Egypt, in Babylon, in China. To day I sup beneath an acacia, and am in America; to morrow I will dine amidst kitchen gardens, under a treilis, and in the shade of lilachs, and shall be in France.

But I hear some one say, is not this kind of life attended with danger? Is it possible that I could meet with my death in the practice of virtue? I have indeed heard that people have lost their lives in the chace, in parties of pleasure, and in voyages, but rarely in acts of beneficence Gold, among the lower classes, powerfully commands respect. I shall appear rich enough to obtain their respect, but not tempt them to rob me. Besides, the police of Paris is in the best order. I use the greatest caution in the choice of my hosts, and if I perceive myself mistaken in them, I pay for my lodging in advance, and never return to it again.

In this plan of life I have no occasion for household goods or for servants. With what tender anxiety I am expected in each of my lodgings! What joy is excited by

my arrival! what attention and what zeal in my hosts to anticipate my wants! I enjoy the delight of the most endearing ties of society, without being subject to their inconveniencies. No one sits down to my table to speak ill of another, and no one quits it to speak ill of me. I have no children; but those of my landlady are more solicitous to please me than their parents. I have no wife; the sweetest pleasures of love is to contribute to the felicity of others. I help to bring about happy marriages, or to preserve in happiness such as are already concluded. I thus charm my own sorrows; I delude my passions by proposing to them the noblest aim they are capable of attaining in the world. I approach the unhappy for the purpose of consoling them, and it is perhaps to them that I shall be indebted for consolation.

'Tis thus you might live, O ye great, and multiply your transient days on this earth, where ye are but sojourners. 'Tis thus you would become acquainted with your fellow-men, and would cease to form a people foreign to your nation, a conquering people that lives upon its spoils. 'Tis thus, when going forth from your palaces, surrounded with a multitude of clients, who would load you with benedictions, ye would revive the remembrance of the first patricians, so dear to the people of Rome. Ye seek every day some new spectacle: can any be more new than the felicity of men? Ye want interesting ones: ca any be more interesting than to behold families of poor peasants diffusing fecundity over your vast and solitary domains, or old soldiers who have deserved well of their country, finding there happy retreats. Your countrymen are preferable to the heroes of tragedy, and to the shepherds of the comic opera.

The indigence of the people is the primary cause of the physical and moral maladies of the rich. For this it is the duty of the administration to provide. As to the maladies of the mind which result from it, I should wish to discover some palliatives for them. For this purpose I

should suggest the formation at Paris of some establishment, similar to those instituted by some charitable physicians and learned lawyers to remedy corporeal evils and the persecutions of fortune; I mean councils of consolation, to which an unfortunate person, sure that his secret would not be revealed, might, even *incognito*, unfold the cause of his sorrows. We have, it is true, confessors and preachers, for whom the sublime function of consoling the unhappy seems to be reserved; but confessors are not always at the call of their penitents, especially when these are poor and not known to them. Nay, there are many confessors who possess neither the talents nor the experience necessary for consoling the afflicted. The question is not to absolve a man who accuses himself of his sins, but to assist him to bear those of others, which oppress him much more. As to preachers, there sermons are in general too vague and too inapplicable to the different circumstances of their auditory. It would be much better if they were to announce the subjects of them to the public rather than their titles and their dignities. They will declaim against avarice to a spendthrift, and against prodigality to a miser. They will speak of the dangers of ambition to a young man amorous and indolent, and those of love to an aged devotee. They will insist on the duty of giving alms before those who receive charity, and on that of humility to the water-carrier. There are some who preach penitence to the unfortunate, who promise Paradise to voluptuous courts, and threaten the poor cottager with damnation. I have seen in the country a wretched woman, whose intellects were deranged by a sermon of this kind. She imagined herself doomed to everlasting perdition, and continually kept her bed without speaking or moving. They never preach on the subject of languor, sadness, scruples, melancholy, grief, and many other maladies which affect the mind. Besides, what innumerable circumstances vary in each auditor the nature of the pain he feels, and render all the scaffolding

of a fine discourse unserviceable to him! It is not easy to find in a wounded and timid mind the precise point which pains it, and to apply to its wound the balm and the hand of the Samaritan. It is an art which is known only to sensible souls who have themselves suffered much, and which is not always the portion of those that are merely virtuous.

The people are sensible of this want of consolation; and finding no man of whom they can demand it, they address themselves to stones. I have sometimes read with emotion in our churches billets affixed by unfortunate persons to the corner of certain pillars in an obscure chapel. They were written by wives ill-treated by their husbands, by young people in embarrassed circumstances; they asked not for money, they only desired prayers. They were ready to be overwhelmed with despair, their distress was inexpressible. Ah! if those who are thoroughly acquainted with affliction were to unite from every condition, and to offer the wretched their experience and their sensibility, more than one illustrious unfortunate would seek of them those consolations which neither preachers, nor books, nor all the philosophy of the world are capable of affording. To sooth the anguish of the lower classes, nothing more is frequently necessary than to find some one to whom they can communicate their sorrows.

A society, formed of men such as I imagine to myself, would endeavor to eradicate the vices and the prejudices of the people. It would strive, for example, to apply some remedy to the barbarity with which they treat their miserable horses, at the same time making the city resound with horrible imprecations. It would likewise prevail upon the rich to have compassion on men in their turn. You see in the hottest weather stone-cutters entirely exposed to the sun, and to the scorching reverberation of their white stone. Hence these poor people are often afflicted with burning fevers and diseases of the eyes,

which render them blind. At other times they are drenched with the long rains of winter, or chilled by its cutting blasts, which produce violent colds. Would it be very expensive to a master who possesses humanity, if he were to fix up on poles over these work-places, a moveable covering of matting or straw, to shelter his men? By these precautions he would preserve them from various maladies both of body and mind; for most of them, as I have observed, pique themselves on a false point of honor, and dare not seek shelter from the heat of the sun, or the inclemency of the weather for fear of incurring the ridicule of their companions.

It is possible to make morality palatable to the people, without much preparation. The very disguise renders truth suspected. I have frequently seen simple mechanics shed tears at the perusal of our best novels, or at the representation of certain tragedies. They afterwards enquired if the subject which had made them weep was true, and when they were told it was fictitious, they made light of it, and were even angry at having been affected for nothing. Fables are necessary for the rich to make them relish morality, and morality cannot render fables palatable to the poor, because the poor expected happiness only from truth, and the rich hope for it only from illusion.

The rich, however, have not less occasion than the vulgar for moral affections. These are, as we have seen, the moving principles of all human passions. In vain they refer the plan of their happiness to physical objects; they are soon disgusted with their palaces, their pictures, and their parks, when instead of sentiments, they experience nothing but sensations. This is so true that if, in the midst of their languor, a stranger comes to admire their luxury, all their enjoyments are renewed. They seem to have devoted their lives to an obscure voluptuousness; but present to them a single ray of glory, even in the jaws of death, and they will fly to it. Offer them

regiments, and they will run to immortality. It is then moral sentiment which it is necessary to refine and to direct in men: consequently, it is not in vain that religion enjoins virtue, which is moral sentiment by excellence, since it is the road to happiness in this world, and in that which is to come.

This society would likewise extend its attention even to the very retreats of virtue. I have remarked that, about the age of forty-five years, a great revolution takes place in the generality of mankind; and, to tell the truth, that they then become worse, and devoid of principle. It is then that women are transformed into men, as a celebrated writer expresses himself, that is, become thoroughly depraved. This fatal revolution is a consequence of the vices of our education, and of our society. Both the one and the other present felicity to man only about the middle of life, in fortune and honors. When we have toiled up this steep mountain, and have attained its summit, towards the middle of our lives we begin to descend with our eyes averted from our youth, because we have before us no other prospect but death. Thus the career of human life is divided into two portions, the one consisting of hopes, the other of recollections, and we have seized on our way nothing but illusions. The former, at least, support us, by creating desires; but the others overwhelm us, leaving behind them only painful regret. This is the reason why our old men are much less susceptible of virtue than the young, though they speak of it much more, and that they are much more dejected among us, than among savage nations. If they were guided by religion and by Nature, they would rejoice at the approach of their end, like the crews of vessels which are just arriving at the desired port. How much more wretched are they, who, having devoted their youth to virtue, seduced by the deceitful voice of the world, look back and regret the pleasures of youth which they have not known! Dazzled by the illusive splendor which encircles the wicked, their

faith is shaken, and they are ready to exclaim with Brutus: "O virtue! thou art but an empty name!" Where shall they find books and divines to strengthen them under these storms, which have assailed even the saints? They inflict secret wounds on the soul, and produce pestiferous ulcers which we have not the courage to reveal. 'Tis only virtuous men, who have been tried by all the combinations of misery, that can afford them relief, and that can recal them, not by the vain arguments of reason, to the sentiment of virtue, at least by that of their friendship.

It appears to me that their exists in China an establishment similar to that which I propose. At least, certain travellers, and among others Fernand Mendez Pinto, speak of a House of Mercy, which pleads the cause of the poor and the oppressed, and which, in an infinity of circumstances, provides for the wants of the unhappy in a much greater degree than even our nuns of the Order of Charity. The empire has bestowed the most noble privileges on its members; and the tribunal of justice pay the utmost deference to their petitions. Such a society, engaged in doing good, would deserve among us at least as many prerogatives as those whose only care is to speak with propriety; and by bringing to light the virtues of our obscure citizens, it would merit of the country at least as much as those which entertain it only with the maxims of sages, or frequently with the splendid crimes of antiquity.

Beware, however, of giving this association the form of an academy or fraternity. Thanks to our education and our manners, all that forms among us a body, congregation, sect, or party, is commonly ambitious and intolerant. If the persons who compose it approach a light they have not kindled, 'tis with a view to extinguish it; if they notice the virtue of others, 'tis for the purpose of blasting it. Not but that the members of these bodies possess individually excellent qualities; but their society is good for

nothing, for this reason alone, that it presents to them different centres from the common centre of their country. What has rendered that sweet word humanity theatrical and vain? What sense is now attached to that of charity, the Greek name of which χάρις, signifies attraction, grace, love? Can any thing be more humiliating than our parish charities, and the humanity of our philosophers.

I leave the development of this plan to some good man who loves God and his fellow-creatures, and who performs good actions, as the Gospel enjoins, without the left hand knowing what the right hand doeth. Is it then so difficult to do good? Take the contrary of the method pursued by the ambitious and the wicked. They keep spies employed to collect for them scandalous anecdotes; let us then have some to pry into secret good works. They seek men who are rising in the world, either to enlist them under their banners, or to ruin them; let us go in quest of virtuous men who are in obscurity, to make them our models. They have trumpeters to sound forth their own actions and to decry those of others: let us conceal ours, and be the heralds of others' good deeds. Vices acquire refinement; let us perfect our virtues.

I find that my digressions lead me too far. But if I should excite but a single good idea in some one more enlightened than myself; if I shall have contributed to prevent, at some future period, one man in despair from drowning himself, or in vengeance from killing an enemy, or in the lethargy of languor from losing his money and his health with prostitutes, I shall not have scrawled over all this paper in vain.

Paris presents to the afflicted numerous retreats known by the name of Hospitals. May God reward the charity of those who founded, and the still greater virtues of those who attend them! But, in the first place without adopting the exaggerations of the people, who imagine that these houses have immense revenues, it is certain that a person well known and profoundly versed in public fi-

mances, having undertaken to establish a hospital, found that the expence of each patient would not amount to more than seventeen sous (eight-pence half-penny) per day; that they were kept much better at that rate, and much cheaper than in the hospitals. For my part, I think that these seventeen sous, distributed daily in the house of a poor patient, would be productive of still greater economy, by affording subsistence to his wife and children. A sick person of the lower class of the people wants very little besides good broth; his family would have the benefit of the meat employed for making it. But the hospitals are subject to many other inconveniences. There are formed diseases of a particular character, often more dangerous than those which the sick bring with them. They are well known, especially those called hospital-fevers. Still greater evils result from them to morals. A person of experience has assured me that most of the criminals who terminate their lives at the gibbet or in the gallies, have been dismissed from hospitals. This amounts to what I have already observed, that all societies are depraved, but particularly a society of beggars. I therefore propose, that instead of collecting together the unfortunate, they should be maintained at the houses of their own relations, or that they should be placed in poor families which would take care of them. Public prisons are absolutely necessary, but I should wish that those who are confined in them were less miserable. Undoubtedly justice, by depriving them of liberty, proposes not only to punish their moral character, but to reform it. Extreme misery and pad company cannot but have the effect of degrading it more and more. Experience farther proves that there the wicked become thoroughly depraved. Many a one who enters culpable through weakness, departs a hardened villain. As this subject has been treated by a celebrated pen, I shall say no more. I shall only observe, that it is impossible to reform men, unless by rendering them more happy How many, who, in Europe,

lived in guilt, have become good people in the islands of America, to which they were transported. They there became honest, because they found more liberty and more happiness than in their native land. There is another class of men still more deserving of pity, because they are innocent. I mean those afflicted with madness. They are confined, and they scarcely ever fail to become still more mad than they were. I shall remark, on this occasion, that I believe there is not a single country of Asia where they are confined, excepting China. The Turks have an extraordinary veneration for them, either because Mahomet was himself subject to temporary derangement, or on account of the religious opinion they hold that when a lunatic sets foot in a house, the benediction of God enters with him. They hasten to set refreshments before him, and lavish upon him all sorts of caresses. No one ever heard of their having offended any person. Our lunatics, on the contrary, are dangerous, because they are miserable. No sooner does a man of this description appear in the streets, than the children, already rendered miserable by education, and delighted to find a human being on whom they may exercise their hatred with impunity, attack him with stones, and take pleasure in putting him into a passion. I shall farther observe, that among the savages there are no lunatics; and I want no other proof than their political constitution, which renders them more happy than civilized nations, since derangement of the understanding is occasioned only by excessive vexation.

Among us the number of confined lunatics is very great. There is not a single provincial town of any magnitude but what has a house for this purpose. Their treatment there is certainly worthy of pity, and calls for the attention of government, for if they are no longer citizens, they are however men, and innocent men. When I was a student at Caen, I recollect to have seen in the madhouse people confined in dungeons, where they had

not seen the light for more than fifteen years. I once visited one of these horrible caverns in the company of the excellent rector of St. Martin, with whom I boarded and who was sent for to administer the last sacraments to one of the unfortunate wretches at the point of death. He was obliged, as well as myself, to hold his nose the whole time he was with him; but the vapor which exhaled from his dunghill was so infectious, that my clothes retained the smell more than two months, as did also my linen, even after it had been several times washed. I could produce facts relative to the manner in which these poor creatures are treated, which would excite horror. I shall, however, relate but one, which is still quite fresh in my memory.

Some years ago, passing through l'Aigle, a small town of Normandy, I took a walk out of the town about sunset. I perceived on a little hill a convent situated in a charming position. A monk who was at the gate invited me to enter, and see the house. He conducted me through a vast court, where the first object I perceived was a man about forty years of age, with his head half covered with a hat, who advanced directly to me, saying: "Plunge your hunting-knife into my her heart!" "Sir," said the monk who accompanied me, "don't be surprised, he is a poor captain who went out of his mind on account of an insult offered to him in his regiment."

"So," said I, "this house is a place of confinement for lunatics." "Yes," said he; "I am the overseer of it." Proceeding from one inclosed place to another, he conducted me to a small yard, containing several small cells of masonry, where we heard some one speaking with great emphasis. We there found a canon, in his shirt and his shoulders bare, conversing with a man of a handsome figure, seated at a small table before one of the cells. The monk went up to the unfortunate canon, and gave him a blow with all his might on his naked shoulders, bidding him begone. His comrade immediately addressed

the monk in these very words: "Man of blood, you have committed a very cruel action: do not you see that the poor wretch has lost his reason?" The confounded monk bit his lips, with a menacing look; but the other added with the greatest composure: "I am your victim; you can do with me whatever you please." Then addressing himself to me, he shewed me his two wrists, cut to the quick by the iron handcuffs, with which they fastened.

"You see, Sir," said he, "in what manner I am treated." I turned towards the monk, and testified my indignation at such cruel usage. He replied: "O! I can make him talk nonsense whenever I please!" I, however, addressed a few words of consolation to the unfortunate man, who, looking at me with confidence said: "I think, Sir, I have seen you at St. Hubert, at the house of Marechal de Broglio." "You are mistaken, Sir," I replied, "I never was at the house of Marechal de Broglio." On this he strove to recollect the different places where he thought he had seen me, with circumstances so minute and so probable, that the monk, piqued with his reproaches and his good sense, thought proper to interrupt his conversation, by speaking to him of marriage, buying horses, &c. No sooner had he touched the cord of his madness, than the poor man began to rave. The monk told me, after he had left him, that he was a man of very good family. Some time afterwards I was informed that he had found means to escape from his prison, and that he had recovered the use of his reason.

Many physical remedies are employed to cure madness, but it frequently proceeds from a moral cause, since it is occasioned by vexation. To restore these unhappy wretches to reason, could not opposite means to those which caused the loss of it, be employed, such as joy, pleasures, and especially music? We see, from the example of Saul and many others, how much music may contribute to re-establish harmony in the soul. These unfortunate people ought at the same time to receive the

mildest treatment; and when they are in their fits of fury, they should not be put in irons, but in places lined with wadding, where they could not hurt either themselves or others. I think that, by taking these humane precautions, many might be recovered, especially when those to whose care they are committed have no interest in perpetuating their madness, as is too frequently the case with families who enjoy their property, and the houses which receive their annuities. In my opinion, likewise, the care of men whose intellects are deranged, should be entrusted to women, and that of women to men, on account of the mutual compassion of the two sexes for each other.

I should wish that there might not be an art or a trade in the kingdom, but what had its asylums and its rewards at Paris. Among the different classes of citizens who exercise them, most of which are but little known in the capital, there is one very numerous class which is not at all known, though it is very miserable, and the rich have the greatest obligations to it: I mean the sailors. It is these rude and unpolished men that go in quest of pleasures for them to the extremities of Asia, and who incessantly expose their lives on our coasts to supply their tables with delicacies. Their conversation is at least as artless as that of our peasants, and incomparably more interesting from their manner of viewing objects, and the singularity of the regions they have visited. The relation of their hardships of every kind, and of the tempests to which they expose themselves to bring you objects of gratification from all parts of the earth, ye favourites of fortune, would teach you to prize your repose more highly! Your happiness would be encreased by these contrasts.

I know not if it was for the purpose of procuring this kind of pleasure, or to give the park of Versailles a very interesting marine aspect, that Louis XIV. transplanted a colony of Venetian gondoliers to the great canal in front of the palace. Their descendants still remain there. This establishment, under better regulations, would have fur-

nished a more suitable asylum for our own seamen. But that great king, frequently influenced by bad counsels, seldom confined the sentiment of his glory to his own people. What a contrast, those men, covered with tar, with their weather-beaten faces, some coming from Greenland, and others from the coasts of Guinea would have exhibited among the marble statues and verdant bowers of the park of Versailles! Louis XIV. might, on more than one occasion, have obtained of these ingenuous men, truths and information which neither books, nor even the admiral of his navy ever gave him; and, on the other hand, the novelty of their costume, and that of their reflections on his own greatness, would have prepared for him spectacles more amusing than those contrived at a great expence by the beaux esprits of his court. Besides, what an emulation for these posts would it not have excited among our seamen! I ascribe part of the perfection of the English navy to the mere influence of their capital, and to its being continually under the eyes of the court. If Paris were a sea-port like London, how many ingenious inventions, wasted on our fashions and our operas, would be directed to the advantage of navigation! If seamen were but seen there as soldiers are, a liking for the navy would be more generally diffused. The lot of our mariners, then become more interesting to the nation and to its chiefs, would be ameliorated, and, at the same time, the brutal despotism of those who frequently govern them only by curses and by blows would be diminished. It is a sound and easy policy to weaken vices by connecting men more closely to each other, and by rendering them more happy. The gentlemen of our provinces did not cease to strike their peasants, till they perceived that those useful men had become interesting objects in our books and in our theatres.

Not that I desire for our seamen an establishment similar to the Hospital for Invalids. The architecture of that monument pleases me highly; but I pity the lot of those

by whom it is inhabited. Most of them are discontented, and are perpetually grumbling, as any one may convince himself by entering into conversation with them: I think not with justice; but experience proves that men, collected into bodies, become sooner or later depraved, and are always unhappy. We ought to follow the laws of Nature, and to collect them into families. Like the English, I would place our invalid seamen in the ferry-boats of the rivers, in the little skiffs which ply the river at Paris, and scatter them along the Seine like Tritons at our country-seats. We should see them in shallops with lattin sails ascending our rivers, and tacking first to one side and then to the other; and they would introduce modes of navigation more speedy and more commodious, which are still unknown there. As to those whom age and wounds have entirely disabled, a suitable provision ought to be made for them in a house resembling that founded by the English at Greenwich for their invalid seamen. But, to tell the truth, I am persuaded that the state would find it more economical to allow them pensions, and that the men themselves would be much more comfortable in the bosom of their families: this, however, would not prevent the erection of some majestic and convenient monument at Paris, to serve as an asylum for those brave fellows. The capital takes little notice of them, because it is unacquainted with them; but there are many in their number, who, by going over to the enemy, are capable of conducting a successful descent in our colonies, and even upon our own coasts. Our sailors desert in as great numbers as our soldiers, and their desertion is a much heavier loss to the state, because more time is required to form them, and their local knowledge is much more important to our enemies that that of our cavalry or foot-soldiers.

What I have said concerning our sailors may be applied to all the other conditions in the kingdom, without exception. I wish there might not be any but what should have its

centre at Paris, and should there find an asylum, a retreat, and a little chapel. All these monuments of the different classes of citizens, who impart life to the political body, decorated with the attributes peculiar to each profession, would there figure exceedingly well.

After having rendered the capital very happy and very good for our own countrymen, I would invite to it foreigners from all parts of the world. O women, who govern our destinies, how much ought ye to contribute to unite men in the city where ye reign! They are engaged all over the world in procuring pleasures for you. While you have nothing to do but to enjoy yourselves, a Laplander is pushing off amidst tempests to harpoon the whale, whose barbles serve to swell out your robes; a Chinese is putting into the oven the porcelain in which you will take the coffee that the Arab of Mocha is employed in gathering for you; a girl of Bengal is weaving your muslins on the banks of the Ganges, while a Russian, amid the pines of Finland, is felling the mast of the vessel that will convey it to you. The glory of a great capital is to unite within its walls men of all the nations which concur in its pleasures. I should like to see at Paris, Samojedes with their seal-skin dresses and their boots of sturgeon's skin, and black Jolofs with their cotton cloths striped with red and blue. I should wish to see there the beardless Indians of Peru, covered with feathers from head to foot, walking without fear in our public places, round the statues of our kings, by the side of haughty Spaniards in mantles and mustachios. I would enjoy the pleasure of seeing the Dutch establish themselves on the arid eminences of Montmartre, and indulging in their hydraulic inclinations like beavers, find the means of there procuring canals filled with water; while the natives of the shores of the Oronoko would live dry above lands inundated by the Seine, among the foliage of willows and alders. I should wish Paris to be as extensive, and to contain a population as diversified as the ancient cities of Asia, such as Nineveh and Susa, which

were three days' journey in circumference, and where Ahasuerus beheld two hundred nations bending before his throne. I would have all the nations of the earth to correspond with this city, as all the members of the human body with the heart. What secrets had the Asiatics for founding cities so vast and so populous? They are our electors in every respect. They permitted individuals of every nation to settle there. Offer men liberty and happiness and you will draw them together from all parts of the world.

It would be worthy of the humanity of some great prince to propose to Europe this question: "Does not the happiness of a nation depend on that of its neighbors? The affirmative fully proved would refute the contrary maxim of Michiavel, which has for such a long period governed our European politics. It would be very easy, in the first place, to demonstrate that the mere understanding with its neighbors would enable it to disband those armies by land and sea which are so burthensome to the people. In the next place, it should be shewn that every nation has participated in the advantages and calamities of its neighbors, from the example of the Spaniards, who discovered America, and who dispersed over the rest of Europe the blessings and the evils of that discovery. This truth might be farther proved by the prosperity and greatness attained by nations who took care to conciliate their neighbors, as the Romans, who granted them the rights of citizens, step by step, and thus at length formed all the inhabitants of Italy into one single nation. They would undoubtedly have made but one people of all mankind, had not their barbarous custom of keeping foreign slaves to wait upon them laid restrictions on such a human policy. Then should be demonstrated the misfortune of governments, which, though internally well regulated have existed in a state of perpetual anxiety, continually feeble and divided, because they did not extend humanity beyond their own territory; and such at the present day is Persia, which fell into extreme imbecillity immediately after the

brilliant reign of Shah Abbas, whose political maxim it was to surround himself with deserts; his own country has at last become one, as well as that of his neighbors. Other examples of this might be found among the powers of Asia, to which handfuls of Europeans dictate laws.

Henry IV. had formed the celestial project of enabling all Europe to live in peace; but his plan was not sufficiently extensive to uphold itself: war would have advanced from the other quarters of the world to disturb its repose Our destinies are connected with those of the human race. It is an homage which must be paid to religion, and which religion alone deserves; Nature says to us: "Love yourself alone;" domestic education says: "Love your family;" the nation says: "Love your country; but religion alone enjoins us to love all men without exception. Religion is more thoroughly acquainted with our interests than our natural instinct, our parents and our politics. Human societies are not partial, like those of animals. It is of very little consequence to the bees of France if the hives of America be destroyed. But the tears of men in the New World cause streams of blood to flow in the Old, and the war-whoop of a savage on the banks of a lake, has more than once resounded in Europe, and disturbed the repose of kings. Religion, which forbids us to love ourselves, and enjoins us to love all men, does not contradict herself, as certain sophists have pretended; she requires the sacrifice of our passions, only for the purpose of directing them towards the general happiness, and by ordering us to love all men, she imparts to us the only true means of loving ourselves. I should therefore wish that our political relations with all the nations of the world were confined to this one point, that of giving their subjects a favorable reception in the capital of the kingdom. If we were to employ for this purpose only a part of the sums we expend for foreign affairs, we should not be the worse for it. The Asiatic nations send neither consuls, nor ministers, nor ambassadors abroad, unless in extraor-

dinary cases, and they are themselves visited by all the people of the earth. It is not by sending ambassadors to our neighbors at a great expense, that we shall conciliate their friendship. Our pomp very often becomes a secret source of hatred and of jealousy among their grandees. It is by giving a welcome reception to their subjects, feeble, persecuted, unhappy. It was our French refugees who transferred part of our industry and of our power to Prussia and to Holland. How many secret relations of commerce and of national benevolence have been formed by such receptions! An honest German, who retires to Austria after making a fortune in France, causes one hundred of his countrymen to settle among us, and disposes the whole district in which he resides to wish us well. It is by such ties that national friendships are formed much better than by diplomatic treatise, for the opinion of the people always governs that of their prince.

After having rendered the city of men happy, I would endeavour to embellish the city of stone, and to render it commodious. I would erect in it a multitude of monuments; I would have, in front of the houses, arcades as at Turin, and pavements as in London, for the convenience of pedestrians; in the streets, trees and canals, if possible, as in Holland, to facilitate the conveyance of goods; in the suburbs, caravanseras, as in the cities of the East, to furnish foreign travellers with accommodations at a small expence; about the centre of the city, spacious market-places, surrounded with houses six or seven stories high, for the lower classes, who will soon be at a loss where to find lodgings. I would introduce great variety into their plan and decoration. Their circumference should exhibit temples, courts of justice, public fountains, and the principal streets should run into them. These markets, shaded with trees, and divided into large compartments, would present in the greatest order all the gifts of Flora, of Ceres, and of Pomona. In the centre I would erect the statue of a good king, for it could not be placed in a situation

more honorable to his memory than amidst a concourse of his subjects.

I know nothing that gives me a more accurate idea of the police of a city, and of the happiness of the inhabitants, than the sight of its markets. At Petersburg each market is divided into quarters, destined for the sale of a particular commodity. This order appears pleasing at first sight, but it soon fatigues from its uniformity. Peter the first was fond of regular forms, because they were favorable to despotism. For my part, I should wish to see in these places the greatest concord among our dealers, and the greatest contrasts between their commodities. By removing the rivalship arising from the commerce in the same articles, we should banish from among them the jealousies which occasion so many disputes. I would have Abundance pour forth all her horns at random; let their be seen pheasants, fresh cod, moor-game, turbot, greens, piles of oysters, oranges, wild ducks, flowers, &c.; let people be permitted to expose there for sale every species of merchandize, and this single privilege would be sufficient to destroy many monopolies.

In the city I would erect temples in small number, but august, immense, having galleries within and without, and capable of containing on holidays one third of the population of Paris. The more numerous churches become in a state, the more religion is weakened there. This appears a paradox; but look at Greece and Italy covered with steeples, while Constantinople is full of Greek and Italian renegadoes. Independent of the political and even religious causes which occasion these national depravations, there is a natural one, the effects of which we have already discovered in the weakness of the human mind. It is thus that our affection is diminished when it is divided among too many objects. The Jews, whose attachment to their religion is truly astonishing, had but one single temple, the recollection of which still excites their regret.

I would construct at Paris amphitheatres as at Rome,

or the purpose of assembling the people, and giving them feasts from time to time. What a superb site would the hill at the entrance of the Elysian Fields present for such an object! How easy it would be to dig it away to the level of the plain in the form of an amphitheatre, arranged in steps covered with simple turf, and crowned with lofty trees at its summit, which would be more than eighty feet in height! What a magnificent sight it would be to behold an immense population range around it, like one family, eating, drinking, and enjoying the spectacle of their own felicity.

All these edifices should be constructed of stone, not in small courses, like ours, but in vast blocks, as the ancients employed them,* and as would become the eternal city. The streets and the public places should be planted with stately trees of different kinds. Trees are the real monuments of nations. Time, which soon defaces the works

* And as the savages employ them. Travellers are extremely surprised at beholding in Peru the monuments of the ancient Incas, formed of great, irregular stones, joined together with the utmost precision. Their construction presents at the first view two great difficulties: How could the Indians remove these vast masses, and by what means could they make them fit so perfectly to each other, notwithstanding the irregularity of their form? Our men of science have first supposed machines for conveying them, as if it required machines more powerful than the arms of a whole nation acting in concert. They have afterwards asserted that the Indians gave them these irregular forms by dint of labor and attention. But would it not have been much easier to cut them regularly than irregularly? I was myself at a loss for a long time to resolve this problem. Having, at last, read in the memoirs of Don Ulloa, and likewise in the accounts of some other travellers, that in various parts of Peru there are beds of stone on the surface of the earth which are full of clefts and chasms, I immediately comprehended the contrivance of the ancient Peruvians. They did nothing more than raise in masses these horizontal beds of quarries, and place them perpendicularly, fitting the pieces into each other. They had thus a wall ready made, without the labor of cutting. Natural genius possesses resources extremely simple, and far superior to those of our arts. For example, the savages of Canada had no iron pots before the arrival of the Europeans. They supplied their place by hollowing out the trunk of a tree with fire. But how did they contrive to boil whole oxen in them as they were in the habit of doing? This question I have proposed to more than one person of reputed genius, who were unable to answer it. For my own part, I must confess that I could not conceive it possible to boil water in wooden vessels, many of which contained several hogsheads. Nothing, however, was more easy to the savages. They heated stones in the fire till they were red hot, and then threw them into the water till it boiled. (See Champlain.)

of man, only increases the beauty of those of Nature. It is to the trees that the Boulevards, so much frequented as a public walk, owe their greatest charms. They delight the eye by their verdure, they raise the soul towards heaven by the height of their stems; they add to the respect paid to the monuments besides which they are planted by the majesty of their forms. They contribute more than we think to attach us to the places where we have lived. Our memory fixes upon them as on points of reunion which have certain secret harmonies with the soul. They rule over the events of our lives, as those which are situated on the sea-shore, and serve as land-marks to pilots. I never see linden-trees but they remind me of Holland, nor pines without imagining myself in the forests of Russia. They frequently attach us to our country, when the other ties which bound us to it are broken. I know more than one exile, who, in his old age, has been led back to his native village by the recollection of the elm beneath whose shade he had danced in his youth. I have heard more than one inhabitant of the Isle of France sigh for his native land in the shade of the banana, and say: "I should be happy here, could I but see the violet." The trees of our country have still greater attractions when they are connected, as among the ancients, with some religious idea, or with the remembrance of some great man. Whole nations have attached their patriotism to them. With what veneration the Greeks beheld at Athens the olive which Minerva planted there, and at Mount Olympus, the wild olive with which Hercules had been crowned. Plutarch relates that, at Rome, when the fig-tree under which Romulus and Remus had been suckled by a she-wolf, began to droop, the first who perceived it, cried: "Water; water!" and the affrighted people ran with pots and buckets full of water to refresh it. For my part, I am of opinion, that though we are very far removed from nature, yet we should not behold without emotion the wild plumb-tree, which our good Henry IV.

had climbed when he perceived the Duke de Mayenne's army defiling in the bottom of the adjacent valley.

A city, were it even of marble, would appear dismal to me, if I saw in it no trees and no verdure;* on the other hand, a landscape, were it Arcadia, were it the banks of Alpheus, or the brow of Mount Lyceus itself, would appear wild to me unless I perceived in it at least one little cottage. The works of Nature and those of man impart to each other mutual graces. The spirit of self-interest has destroyed among us the love of Nature. Our peasants discover no beauties in our fields but where they see a profit. One day in the vicinity of the abbey of La Trappe, on the gravelly road to Notre Dame d'Apre, I overtook a female peasant, trudging along with two large loaves under her arm. It was in the month of May, and the most delightful weather that could be. "What a charming season!" said I to the good woman. "How beautiful are those apple-trees in flower! How the nightingales are singing in those woods!"—"Ah!" replied she, "I care very little about flowers, or those little screechers; it is bread we want!" Indigence shuts the hearts of our peasants, and opens their eyes. But our citizens set no higher value on Nature, because the love of gold directs all their propensities. If some of them esteem the liberal

* Trees, from their duration, are real monuments of nations, and they are likewise their calendar, from the different seasons at which they produce leaves, flowers, and fruits. The savages have no other, and our peasants themselves frequently make use of them. One day towards the end of summer, I met a young country girl weeping, and seeking a handkerchief she had lost on the road. "Was your handkerchief a good one?" asked I. "Sir," said she, "it was quite new; I bought it this bean-time." I have thought oftener than once, that if our celebrated historical epochs were dated from those of Nature, nothing more would be necessary to cover them with ridicule and infamy. If we were to read, for example, in our histories, that a prince caused part of his subjects to be massacred, in order to gain the favor of Heaven, precisely at the time when his kingdom was covered with rich harvests; that our bloody battles and bombardments of towns were dated from the flowering of violets or sheep-shearing time, no other contrasts would be requisite to render the perusal of them abominable. On the contrary, these dates would add immortal graces to the actions of good princes, and would mingle their benefactions with those of heaven.

arts, it is not because those arts imitate natural objects, it is on account of the price which the hand of a great master attaches to his productions. The man who gives ten thousand crowns for a landscape by Le Lorrain, would not put his head out of the window to see the origina. from which it was painted: and another locks up with the utmost care the bust of Socrates, who would not open to his door the philosopher were he alive, and would perhaps contribute to his death, if he were persecuted.

The taste of our artists has been perverted by that of our citizens. As they know that is less Nature than their work which is esteemed, they seek only to shew off themselves. Hence it is that they introduce a great number of rich accessories into most of our monuments, and that they frequently forget the principal object. They make, for example, for gardens, vases of marble in which you cannot plant any vegetable; for apartments, urns and *amphoræ*, into which you cannot pour any kind of liquid; for our cities, colonnades without palaces, doors in places where there are no walls, public squares divided by barriers to prevent the people from assembling there. This is done, we are told that the grass may grow. A pretty project truly! One of the heaviest maledictions which the ancients pronounced against their enemies, was that they might see the grass grow in their public places. If people wish to see verdure in ours, why do they not plant trees, which would afford them at one and the same time shade and shelter? There are some who introduce into the trophies which crown the mansions of our princes, bows, arrows, battering-rams, and who have carried their simplicity so far as to plant on them Roman standards with the letters S. P. Q. R. This may be seen on the palace of the Bourbon family. Posterity will believe that the Romans were masters of our country in the eighteenth century. And how can we, who are so vain hope to transmit our memory to it, if our monuments, our medals,

our trophies, our dramas, our inscriptions, treat incessantly of nothing but foreigners and antiquity?

The Greeks and the Romans were much more consistent. They never conceived the idea of erecting useless monuments. Their beautiful vases of alabaster and chalcedony served on festive occasions to hold wine or perfumes; their peristyles always announced a palace; their public places were solely destined for the assemblage of the citizens. They there placed the statues of their great men, without inclosing them with iron railing, that their images might still be within reach of the unfortunate, and that they might be invoked by them after death, as they had been during their lives. Juvenal mentions a brass statue at Rome, the hand of which were worn away by the kisses of the people. What glory for the memory of the citizen whom it represented! Were it still in existence, its mutilation would render it more precious than the Venus de Medici with her exquisite proportions.

Our nation we are told, is destitute of patriotism. I believe it, for every possible effort is made to extinguish that sentiment in it. For example, on the pediment of the beautiful church erected to St. Genevieve,* which is too small, like most of our modern monuments, is represented an adoration of the cross. The Patroness of Paris is seen indeed, on basso relievos, under the peristyle, in the midst of cardinals; but would it not have been more proper to have exhibited to the people their humble patroness in the habit of a shepherdess, with her scrip, her crook, her dog, her sheep, her moulds for making cheeses, and all the costume of her age and condition, in the middle of the pediment of the church dedicated to her? To this might have been added a view of Paris, as it was in her time. Hence would have resulted very agreeable contrasts and objects of comparison. By the sight of

* Since called the Pantheon, but restored in 1806 to its original appellation, and appropriated to the reception of the remains of illustrious Frenchmen.

this rural monument the people would have been reminded of ancient times. They would have conceived an esteem for the obscure virtues which are necessary to them, and they would have endeavored to walk in the rugged paths of glory trodden by their humble patroness, whom it is now impossible to recognize with her Grecian habit, and in the midst of prelates.

Our artists sometimes lose sight of the principal object so far as to omit it altogether. Some years since in one of the workshops of the Louvre, was exhibited the tomb of the Dauphin and Dauphiness, intended for the cathedral of the city of Sens. Every one ran to see it, and returned in rapturous admiration. I went like the rest; the first thing I looked for was the likeness of the Dauphin and Dauphiness, to whose memory the monument was erected. There were not even any medalions of them. You there beheld Time with his scythe, Hymen with urns, and all the trite ideas of allegory, which, be it observed by the way, is frequently the genius of those who have none of their own. To complete the description of this subject, there were upon the pannels a kind of altar, placed in the midst of this group of symbolical figures, long Latin inscriptions, utterly foreign to the memory of the great prince who was the object of it. "A pretty sort of national monument truly!" said I to myself. "Latin inscriptions for French people, and pagan symbols for a cathedral!" If the artist, whose chisel I nevertheless admired, had been desirous of displaying merely his own talents, he ought to have recommended to his successor to leave imperfect a small portion of the base of this monument which death prevented him from finishing, and to engrave upon it these words: *Coistou moriens faciebat.* This consonance of fortune would have united him to this royal monument, and would have given great weight to the reflections on the vanity of human things, which the sight of a tomb cannot fail to produce.

Few artists seize the moral object; they seek only the

picturesque. "Oh what a beautiful subject to represent as Belisarius!" they exclaim when they hear of any modern great man being reduced to indigence. The liberal arts, however, are destined only to perpetuate the remembrance of virtue, and not virtue to furnish employment for the liberal arts. I admit that the celebrity they procure is a powerful motive with most men for performing great actions, though in fact it is not the genuine one; but if it does not inspire the sentiment, it is at least sometimes productive of the acts. At the present day we go much farther. Societies and individuals no longer seek to destroy the glory of virtue, but the honor of distributing it to others. God knows what strange confusion is the result! Married women of very suspected virtue, and kept mistresses establish rose-feasts: they give prizes to chastity. Opera-girls crown our victorious generals. Marechal Saxe, say our historians, was crowned with laurels at the theatres of the Nation; as if the nation had been composed of comedians, and its senate were a theatre! For my part, I consider virtue as so respectable, that one single subject of sterling worth would be sufficient to cover with ridicule those who presume to distribute these vain and contemptible honors. What dancer, for example, would have the impudence to crown the august brow of a Turenne or of a Fenelon!

The French Academy would be much more proper for directing, by the charms of eloquence, the eyes of the nation towards our great men, if it sought less by its eulogies to pronounce a panegyric on the dead than a satire on the living. Posterity will mistrust alike eulogy and satire. The very word eulogy carries with it the suspicion of flattery: besides, this kind of eloquence characterizes nothing. To paint virtue, failings and vices ought to be exhibited, that combats and victories might be made to result from them. The style which is employed is replete with pomp and luxuriance. It is loaded with reflections and with pictures frequently foreign to the prin-

cipal object. It resemble a Spanish horse; it makes abundance of motions, but never advances from the spot. This kind of vague, indeterminate eloquence, is not adapted to any great man in particular, because it may be applied generally to all those who have pursued the same career. Change but a few proper names in the eulogy of a general, and you may apply it to all the generals past, present, and to come. Besides its bombastic tone is so ill adapted to the simple language of truth and virtue, that when a writer is desirous of introducing characteristic traits of his hero, that the reader may at least know to whom he alludes, he is obliged to throw them into notes for fear of deranging his academical order.

Most assuredly, if Plutarch had written only the eulogies of celebrated men, they would not be more read at the present day than the panegyric of Trajan, which cost the younger Pliny the labor of so many years. You will never find an academical eulogy in the hands of the vulgar. They may perhaps read those of Fontenelle and a few others, if those who are praised in them studied during their lives the welfare of the people. But the nation is fond of reading history. Some time ago, walking near the Military School, I perceived at a distance, near a gravel-pit, a large column of smoke. I went towards the place to see whence it proceeded. In a very lonely spot, not unlike that in which Shakspeare places the scene of the three witches in Macbeth, I found a poor, old woman, sitting on a stone. She was attentively reading in an old book, and near her was a large heap of herbs, to which she had set fire. I asked her for what purpose she was burning those herbs. She replied that it was to collect the ashes, and to sell them to the laundresses; that for this purpose she bought the unserviceable plants and herbage of gardeners, and waited till they were entirely consumed, to carry away the ashes, lest they should be stolen in her absence. After she had gratified my curiosity, she began reading again with great attention. As

I was particularly desirous to know what was the book with which she charmed her toils, I requested her to tell me the title of it. "It is the life of M. de Turenne," replied she. "And what do you think of it?" said I. "Ah!" answered she with emotion, "he was an excellent man, to whom a minister gave a great deal of trouble during his life."

I retired, with increased veneration for the memory of M. de Turenne, who soothed the cares of a miserable woman. It is thus that the virtues of the low support themselves on those of great characters, like the feeble plants which cling to the trunk of the oak, that they may not be crushed by the foot of the passenger.

SEQUEL OF STUDY XIII.

OF THE NOBILITY.

To encourage the practice of virtue, the ancient inhabitants of Europe had recourse to the expedient of ennobling the descendants of virtuous citizens. In making nobility hereditary they were guilty of a very great error, as they thus closed the career of distinction against the rest of the nation. As it is the perpetual inheritance of a certain number of families, it ceases to be a national reward without which a whole nation may in course of time become noble. This would produce a lethargy fatal to the arts and manufactures, as we see in the example of Spain and of a part of Italy. From the same cause result many other evils, the principal of which is, that two nations, which, at last, have no interest in common, are formed in the state; the spirit of patriotism is destroyed, and they

are easily subdued. Such has been, in modern times, the fate of Hungary, of Bohemia, of Poland, and even of part of the provinces of our own kingdom, such as Bretagne, where the nobility, too numerous and too haughty, formed a class totally distinct from the rest of the inhabitants. It is worthy of remark, that those countries, though republican, though so powerful in the opinion of our political writers, from the freedom of their constitution, were easily subdued by despotic princes, who, we are told, rule only over slaves. The reason is, that the common people of every country prefer one sovereign to a thousand tyrants, and that their fate is always decisive of the fate of their masters. The Romans softened the unjust and odious distinctions which existed between the Patricians and the Plebeians, by granting to the latter, privileges and posts of the highest importance.

That people employed, in my opinion, still stronger means of uniting the two classes of the citizens; I mean adoptions. How many great men were formed among the people by the hope of meriting this kind of reward, not less illustrious and more touching than those bestowed by the country! It was thus that the Catos and the Scipios distinguished themselves, and were engrafted into patrician families. It was thus that the plebeian Agrippa obtained in marriage the daughter of Augustus. I am not aware, but perhaps it is only a consequence of my ignorance, that adoption was ever practised among us, unless by some of the nobility, who, having no heirs, knew not at their death to whom to leave their domains. Adoptions are, in my opinion, far preferable to the distinctions of nobility granted by the state. They would revive illustrious families whose descendants are now languishing in the most abject penury. They would endear the nobility to the people, and the people to the nobility. The privilege of adoption ought, moreover, to be a kind of recompence bestowed on the nobility themselves. Thus, for example, a poor man of rank, who has acquired re-

nown, might adopt a citizen who has obtained honorable distinction. A nobleman would go in quest of virtue among the people; and the virtuous commoner would seek a good man for a patron among the nobility. These political ties appear to me to be stronger and more honorable than those of marriages for interest, which, in uniting two citizens of different classes, frequently alienate their families. Nobility acquired in this manner would be, in my opinion, far preferable to that conferred by public offices, which, being obtained only by venality, is, by that circumstance, divested of respect.

The inconvenience of hereditary succession, which, in the course of time, renders the class of nobility too numerous, would still remain. Some have thought that a remedy might be provided for this by declaring certain conditions noble, such as the mercantile. It is doubtful, however, whether the spirit of commerce be perfectly compatible with the honor and integrity of a gentlemen. Besides, how can those embark in commerce who have no money? Is it not necessary to give a premium to be taught the elements of the profession? And how can this be done by many indigent gentlemen who are not even able to find clothes for their children? Some of these I have seen in Bretagne, who were descended from the most ancient houses in the province, and were obliged for a living, to hire themselves as mowers to the farmers Would to heaven that all conditions were noble, and especially agriculture; for this is the employment all the functions of which are peculiarly adapted to virtue. To be a farmer, you have no occasion to deceive, to flatter, to degrade yourself, or to do violence to any person. You are not indebted for your profits to the vices or to the luxury of the age, but to the bounty of heaven; and you are at least attached to your country by the spot of ground you cultivate. If the condition of a farmer were ennobled, a multitude of advantages would thence accrue to the inhabitants of the kingdom. I shall now suggest a

resource which the state might employ for the benefit of the indigent nobility Most of the ancient seignorial domains are now purchased by people who have no merit but that of wealth, so that the honors of many illustrious houses have fallen into the hands of men who are, in truth, unworthy of them. The king might purchase these manors when they are to be sold, he might reserve the seignorial rights, with a certain quantity of land, and bestow these little domains as civil and military rewards, on good officers, useful citizens, and noble and indigent families, nearly in the same manner as the Timariots in Turkey.

OF AN ELYSIUM.

The elevation to the rank of nobility is attended with this farther inconvenience, that many a one who sets out with the virtues of Marius, finishes with having his vices. I have to propose a method of conferring distinction which is not attended with the dangers of hereditary succession, and of the inconstancy of men: it is this, not to confer till after death the rewards of virtue.

Death affixes the last seal to the memory of man. It is well known what weight was attached to the judgments pronounced by the Egyptians on their fellow-citizens after their death. It was then that the Romans sometimes made demi-gods of them, or somesimes threw them into the Tiber. The people sometimes perform among us a portion of this duty, when priests or magistrates are wanting to fulfil it. I have stood still oftener than once to see a magnificent funeral procession, not so much for the purpose of beholding the pompous ceremony, as of listening to the opinions passed by the people on the most high and mighty lord who was the occasion of it. I have frequently heard them ask: "Was he a good master? Was he a good husband, a good father? Was he charitable to the poor?" This last enquiry they are

particularly anxious to satisfy, because, bearing incessantly in mind their principal want, they scarcely know any other virtue in the rich than benevolence. I have frequently heard others reply: "O! he never did good to any body; he was severe towards his family and his servants." At the interment of a farmer-general, who left a fortune of more than twelve millions, I have heard this expression: "He drove away the poor country-people with a pitch-fork whenever they asked charity at the gates of his mansion." The spectators on this begin to curse the memory of the deceased. Such are usually the funeral orations of the rich in the mouths of the people. Their judgments would undoubtedly lead to farther consequences were not the police of Paris under such excellent regulations.

Nothing but death can ensure reputation, and nothing but religion can consecrate it. This is perfectly well known to our great men. Hence proceeds the splendor of their monuments in our churches. It is not the priests who prevail upon them to direct that they shall be interred there, as many people imagine. The priests would not fail to receive their dues, if they were buried in the country; it is natural to suppose that they would exact a handsome sum for their journey, and they would not inhale, all the year round, in their stalls the infectious odor of dead bodies. The principal obstacle to this necessary police originates with people of rank and fortune, who, though they scarcely ever visit the church during their life-time, are desirous of obtaining a place in it after their death, that the people may admire their monuments and their virtues of marble and of bronze. But, thanks to the allegories of our artists, and the Latin inscriptions of our scholars, the people remain ignorant of their meaning, and make no other reflection at the sight of them than that they must have cost a great deal of money, and that all the copper consumed in them would be employed to much better purpose in the making of kettles.

Religion alone can consecrate in a durable manner the memory of virtue. The late king of Prussia, who was so thoroughly acquainted with the grand springs of politics, did not forget this. As the Protestant religion, which prevails in his dominions, excludes the images of Saints from the churches, he caused the portraits of distinguished officers who had fallen in the service, to be placed in them. The first time I visited the churches of Berlin, I was greatly surprised to observe there several portraits of officers in regimentals. An inscription beneath recorded their names, their age, the place of their birth, and the battle in which they fell. There was also, if I am not mistaken, a line or two in praise of each at the conclusion of these inscriptions. It is impossible to conceive with what military enthusiasm these objects inspired his people. Among us, there is not an order of monks, however mean, but what exhibits in its cloisters and its churches, pictures of its great men, who are indisputably more celebrated and more known than those who have deserved well of the state. These subjects, which are always accompanied with picturesque and interesting circumstances, are the most powerful means they employ for obtaining novices. The Carthusians already perceive that they have fewer novices since their cloister has lost the melancholy history of St. Bruno, so admirably painted by Le Sueur. There is not any class of citizens which care about the portraits of men who have been useful only to the nation and to mankind, unless it be the dealers in prints, who sometimes display their figures, hung in strings, and colored with red and blue. There the people sometimes seek to discover them among those of harlequins and actresses. We shall soon have, it is said, the spectacle of a Museum at the Tuileries; but this royal monument is consecrated rather to talents than to patriotism, and, like many others, will undoubtedly be inaccessible to the lower classes of the people.

It is my wish, in the first place, that no citizen whatever should be interred in the churches. Xenophon relates that

Cyrus, the sovereign of the greatest part of Asia, directed, when dying, that he should be buried in fields under trees, in order, as that great prince observed, that the elements of his body might, as speedily as possible, be commingled with those of Nature, and again contribute to the formation of her beautiful works. This sentiment was worthy of the sublime soul of Cyrus; but in every country, tombs, especially those of great kings, are the monuments most revered by the nations. The Savages look upon those of their ancestors as titles of possession to the country they inhabit. "This country is ours," say they; "the bones of our fathers repose in it." When they are obliged to leave it, they dig them up with tears, and carry them away with demonstrations of the highest respect. The Turks inter their dead by the side of the highways, after the manner of the Romans. The Chinese make enchanting spots of their burial places. They deposit their dead in the vicinity of towns, in grottoes, scooped in the sides of hills; they decorate the entrance with architecture, and plant before and about them groves of cypress and fir, intermingled with trees that produce flowers and fruits. These places inspire a melancholy pleasing and profound, not only by the natural effect of their decoration, but by the moral sentiment excited in us by tombs, which, as we have elsewhere observed, are monuments placed on the borders of the two worlds.

Our great men, therefore, would not lose any of the respect which they wish to attach to their memory, if they were interred in public cemeteries, in the vicinity of the capital. Here might be erected a spacious sepulchral chapel, appropriated to funeral ceremonies, which frequently derange the regular service in parish churches. Artists might give full scope to their powers in the decoration of these mausoleums; and the temples of humility and of truth would no longer be prophaned by the vanity and the falsehood of epitaphs.

While each citizen would be left at liberty to chuse

any kind of lodging he pleased in this last and eternal inn, I should wish a place near Paris to be chosen and consecrated by religion for the purpose of collecting there the ashes of men who have deserved well of their country.

The services that may be rendered it are numerous and of very different natures. We scarcely know more than one kind, proceeding from formidable qualities, such as valor. We respect nothing but what inspires us with fear. The marks of our esteem are frequently testimonies of our weakness. We are elevated only by fear, and not by gratitude. There is no modern nation, however small, but what boasts of its Alexanders and its Cæsars, but none that has its Bacchus and its Ceres. The ideas of the ancients, who were at least as brave as we, were indisputably more just. Plutarch somewhere observes that Ceres and Bacchus, who were mortals, were raised to the rank of gods, on account of the blessings, pure, durable, and universal which they had conferred on men; but that Hercules, Theseus, and the other heroes, were placed only among the demi-gods, because the services they rendered to mankind were transient, limited, and mingled with many evils.

I am frequently astonished at our indifference towards the memory of those of our ancestors who have brought us useful trees, whose fruits and whose shade now afford us so much pleasure. The names of these benefactors are, in general, totally unknown, yet their benevolence is perpetuated for us from age to age. It was not thus that the Romans acted. Pliny boasts that among the eight species of cherries known at Rome in his time, there was one called the Plinian, from the name of one of his relations, to whom Italy was indebted for it. The other species of the same fruit bore the names of the most illustrious families at Rome, and were called the Apronian, the Actian, the Cecilian, the Julian, &c. He informs us that it was Lucullus who, after the defeat of Mithridates, brought the first cherry-trees from the kingdom of Pontus to Italy

whence they spread in one hundred and twenty years over all Europe, and even as far as Britain, which was then peopled by barbarians. They were probably the first means towards civilization of the island; for the first laws always arise out of agriculture, and for this reason the Greeks denominated Ceres the legislatrix Pliny in another place congratulates Pompey and Vespasian for having brought to Rome the ebony-tree and that which yields the balm of Judea, to grace their triumphs, as if they had then triumphed not only over nations, but over the very nature of their countries. Assuredly if I had any wish that my name should be perpetuated, I would rather it were given to a fruit in France, than to an island in America. In the season of that fruit, my countrymen would bless my memory. My name would be more durable in the baskets of peasants than if inscribed on columns of marble. I know no monument of the house of Montmorenci more durable or more dear to the people than the cherry, which is called by that name. The good-henry, otherwise *lapathum*, which grows without cultivation in the fields, will be a more lasting record of the memory of Henry IV. than the statue of bronze erected on the Pont Neuf, notwithstanding the iron railing and the guards by which it is surrounded. If the seeds and the heifers which Louis XV. sent from a native impulse of humanity to the island of Otaheite, should multiply there, they will preserve his memory longer, and endear it more among the people of the South Sea than the little brick pyramid which flattering academicians attempted to erect to him at Quito, and perhaps than the statues raised to him in his own kingdom.

The benefit of a useful plant, is, in my opinion, one of the most important services that a citizen can render to his country. Foreign plants connect us with the nations from which they come; they transport to our climate something of their felicity and of their genial suns. An olive-tree represents to me the happy region of Greece much better than the work of Pausanias; and I think the gifts

of Minerva much more strongly expressed by it than by medallions. Under the Indian-chesnut, in flower, I repose beneath the rich umbrage of Asia; the perfume of the lemon transports me to Arabia; and when I smell to the sun-flower I am in voluptuous Peru.

I would, therefore, begin with erecting the first monuments of public gratitude to those who have introduced among us useful plants. For this purpose I would chuse one of the islands of the Seine, in the neighbourhood of Paris, and convert it into an Elysium. For example, I would take that which is below the bold bridge of Neuilly, and which, in a few years, will infallibly be comprehended in the suburbs of Paris. I would add to it that branch of the Seine which is unserviceable for navigation, and a large portion of the adjacent continent. Around this vast tract and along its shores, I would plant the trees, shrubs, and plants with which France has been enriched for several ages past. There would be seen the Indian chesnut, the tulip-tree, the mulberry, the acacias of America and of Asia, the pines of Virginia and of Siberia, the auricula of the Alps, the tulip of Calcedonia. The service-tree of Canada with its scarlet bunches, the *magnolia grandiflora* of America, which produces the largest and most fragrant flowers, and the *thuia* of China, which has none that are apparent, would entwine their branches, and would form, here and there, enchanted bowers. Beneath their shade, and amid plants of different shades of verdure, should be placed the monuments of those who brought them to France. Around the magnificent tomb of Nicot, ambassador from France to Portugal, which is at present in the church of St. Paul, would grow that celebrated plant tobacco, at first called after him Nicotiani, because he was the first who extended the knowledge of it all over Europe. There is not a prince of Europe but what owes him a statue for his service; for there is not any vegetable in the world that has brought so much money into their exchequers, and afforded so many pleasing illusions to their

subjects: the nepenthe of Homer is not to be compared to it. On a marble slab near the preceding, might be engraved the name of the Flemish Auger de Busbeck, or Busbequius, ambassador of Ferdinand I. king of the Romans to the Porte, whose letters are so extremely interesting; and this little monument might be placed beneath the shade of the lilach, which he brought from Constantinople, and presented to Europe in 1562. The lucerne of Media would surround with its branches the monument consecrated to the memory of the unknown farmer who first sowed it on our gravelly hills, and clothed our dry lands with pasturage, which may be renewed four times within the year. At the sight of the solanum of America, whose root produces the potatoe, the people would bless the name of him who procured them an aliment which, like wheat, dreads neither the inconstancy of the elements nor the granary of the monopolist. Nor would they behold without interest the urn of the unknown traveller who adorned the humble windows of their obscure dwellings for ever with the brilliant colors of Aurora, by bringing from Peru the flower of the nasturtium.*

Advancing into this agreeable place, we should behold beneath domes and porticoes, the relics and the busts of those, who, by the invention of arts, taught us to make the most of the productions of Nature, and who, by their genius, spared us long and laborious toils. They would require no epitaphs. The figures of the stocking-frame, of the machine for throwing silk, of the wind-mill, would be inscriptions august and expressive on the tombs of their inventors, as the sphere and the cylinder on that of Archimedes. The air-balloon might one day be engraved on the tomb of Montgolfier; but we ought first to know if

* For my part, I should behold the monument of that man, were it only a tile, with greater respect than the superb mausoleums erected, in several parts of Europe and America, in honor of the cruel conquerors of Mexico and Peru. More than one historian has written their eulogy; but Divine Providence has done them justice. All perished by a violent death, and most of them by the hand of the executioner

this extraordinary machine, which conveys men through the air by means of a globe of air dilated by the fire or gas, will contribute to the happiness of nations; for the name of the inventor even of gunpowder, if it were known, could not be admitted into the asylum of the benefactors of humanity.

On approaching the centre of this Elysium, we should find the still more venerable monuments of those, who by their virtue, have bequeathed to posterity fruits still sweeter than those of the vegetables of Asia, and have exercised the most sublime of all talents. Here would be seen the tombs and the statues of the generous Duquesne, who equipped a squadron at his own expence, for the defence of his country; of the wise Catinat, equally tranquil in the mountains of Savoy, and in the humble retirement of St. Gratien; and of the heroic Chevalier d'Assas, who sacrificed his life at night to the safety of the French army, in the woods of Closterkam. There would be the illustrious writers who kindled in their countrymen the love of magnanimous deeds; there would be seen Amyot resting on the bust of Plutarch. And thou who gavest at once the precept and the example of virtue, divine author of Telemachus! we should behold thy ashes and thy figure in this image of those Elysian Fields which thou hast so admirably described.

Here too the monuments of virtuous females would find a place, for virtue knows no distinction of sex. We should here see the statues of those, who, though possessing beauty, preferred a life of labor, far removed from the frivolous pleasures of the world; mothers of families who restored order in a deranged house, who, faithful to the memory of a frequently faithless husband, preserved their conjugal fidelity even after his death, and sacrificed their youth to the education of their beloved children; and, finally, those who attained the highest degree of lustre by the very obscurity of their virtues. To this place should be removed the tomb of a lady named Lamoignon, from

the poor church of Saint Giles, where it is unnoticed; her affecting epitaph would render it still more worthy of the situation than the chisel of Girardon, of which it is the master-piece. There we find it recorded that her friends intended to inter her remains in another place; but the poor of the parish, who had often tasted her bounty, carried her body away by force, and deposited it in their church. They themselves would undoubtedly convey the relics of their benefactress, and exhibit them there to the public veneration.

> Here patriots live, who, for their country's good,
> In fighting fields were prodigal of blood;
> Priests of unblemish'd lives here made abode,
> And poets worthy their aspiring god:
> And searching wits of more mechanic parts,
> Who grac'd their age with new-invented arts:
> Those who to worth their bounty did extend,
> And those who knew that bounty to commend.
>
> *Æneid, book* 6.

Here would be monuments of every kind distributed according to the different merits of individuals: obelisks, columns, pyramids, urns, basso relievos, medallions, statues, pedestals, colonnades, domes; they should not be heaped together, as in a warehouse, but arranged with taste; nor should they all be of white marble, as if they came out of the same quarry, but of marbles and stones of every color. In this vast tract, which I suppose to be at least a mile and a half in diameter, there should neither be regular lines, nor earth dug up, nor lawns, nor trees cut and cropped, nor any thing whatever to resemble our gardens. There should even be no Latin inscriptions, no mythological expressions, nothing that savored of its peculiar Academy. Still less should there be any titles of dignities and honors which recal the vain ideas of the world; all the qualities which are destroyed by death should be excluded; nothing should there be noticed but good actions, which survive the performer of them, which are the only titles to the notice of posterity, and to the rewards of the

Almighty. The inscriptions should be simple, and should arise out of each subject. It would not be the living who would here speak in vain to the dead and to inanimate objects, as in ours, but the dead and inanimate objects addressing the living for their instruction, as among the ancients. This correspondence of an invisible with a visible nature, of time past with time present, imparts to the soul the celestial extension of infinity, and is the source of the delight we receive from ancient inscriptions.

Thus, for example, on a rock planted in the midst of a bed of Chili strawberries, would be read these words:

I was unknown in Europe; but in such a year, such a person, born in such a place, transplanted me from the lofty mountains of Chili; and now I produce flowers and fruits in the happy climate of France.

Beneath a basso relievo of colored marble, representing little children eating, drinking, and diverting themselves, we should find this inscription:

We were exposed in the streets to dogs, to famine, and to cold; such a person, of such a place, took us in, clothed us, and gave us the milk refused us by our mothers.

At the foot of a statue of white marble of a young and beautiful woman, sitting and wiping her eyes, with the expression of mingled joy and grief:

I was hateful to heaven and to mankind; but, smitten with repentance, I appeased heaven by my tears, and made amends for the evil I had done to men by attending the unfortunate.

Near the above, beneath the figure of a young female in a mean dress, spinning at her wheel, and looking with ecstacy towards heaven, should be read the following:

I despised the vain joys of the world, and now I am happy.

Some of these monuments should have nothing but the mere name for their eulogy: such should be, for example, the tomb containing the ashes of the author of Telemachus, unless these words, so well adapted to his amiable and sublime character, were engraved upon it:

He fulfilled the two precepts of the law; he loved God and men.

I have no occasion to observe these inscriptions might be composed in a better style than mine; but one thing I should insist upon, namely, that in these figures there should be nothing of an insolent look, no hair streaming in the wind, like that of the angel sounding the trump of the resurrection; no theatrical grief and violent movements of the drapery, as in the Magdalen of the Carmelites; no mythological attributes, which are above the comprehensions of the common people. Each person would there be represented in his proper dress; we should there see sailors in their jackets; nuns in their mob caps; Savoyards with their stools, milk-pots, and soup-basins. These statues of virtuous citizens would be quite as respectable as those of the heathen gods, and certainly more interesting than those of the antique grinder and gladiator: but it would be necessary for our artists to study to express, like the ancients, the characters of the soul in the attitude of the body and in the features of the face, such as repentance, hope, joy, sensibility, innocence. These are the costumes of Nature which never vary, and which always please, under whatever habit they may be exhibited. Nay, even the meaner are the occupations and the dress of these persons, the more sublime the expression of charity, of humanity, of innocence, and of all their virtues will appear. A young and beautiful woman, working like Penelope at a loom, and modestly dressed in a Grecian robe with long folds, would undoubtedly afford pleasure to every eye: but I should think her a thousand times more moving than Penelope herself, engaged in the same occupation, in the rags of penury and misfortune.

On these tombs would be seen neither skeletons nor wings of bats, nor the scythe of Time, nor any of those frightful attributes with which our slavish education strives to instil into our minds the fear of death, that last blessing of Nature; but we should behold on them the emblems

indicative of a happy and immortal life; vessels battered by the tempest, making the desired port, and doves flying towards heaven.

The sacred statues of virtuous citizens, crowned with flowers, exhibiting in their features the characters of peace and consolation, should be ranged in the centre of the island, round a vast green, beneath the trees of the country, the stately beech, the majestic fir, the chesnut laden with fruit. There too we should see the vine married to the elm, and the apple-tree of Normandy covered with its fruits colored like flowers. From the middle of this green would rise a temple in the form of a rotunda. It should be surrounded with a peristyle of majestic columns, as was formerly the *Moles Adriana* at Rome: but I would have it to be much more spacious. On the frieze should be inscribed these words:

To the love of mankind.

In the midst should be an altar simple and unadorned, where, on certain days, divine service should be performed. Neither sculpture, nor painting, nor gold, nor jewels, would be worthy to decorate the interior of this temple; but sacred inscriptions should announce the kind of merit which there obtains the crown. It is true, that all those who would repose near it would not be saints: but over the principal door we should read on a white marble slab these divine words.

Her sins, which are many, are forgiven, for she loved much.

On another part of the frieze might be engraved the following, which instructs us in the nature of our duties:

Virtue is an effort made in spite of ourselves, for the benefit of our fellow-creatures, with the intention of pleasing God alone.

To this might be added the following, which is calculated to repress our ambitious emulations:

The smallest act of virtue is more commendable than the exercise of the greatest talents.

On other tablets might be inscribed maxims inculcating hope in divine providence, borrowed from the philosophers of all nations, such as the following, which is taken from the modern Persians:

*When you are most afflicted, then you have the greatest reason to expect consolation. The narrowest part of the valley is at the entrance of the plain.**

And the following, which is from the same country:

Whoever has firmly attached his heart to God, is happily delivered from all the afflictions that can befal him in this world and in that which is to come.

Philosophic sentences on the vanity of the things of this world might likewise be introduced, such as this:

Reckon your days by pleasures, by love, by riches, by grandeur, and the last will accuse all the preceding of vanity.

Or the following, which opens a prospect into the next life:

He who has given light to the eyes of man, sounds to his ears, perfumes to his smell, and fruits to his taste, will one day fill his heart, which nothing here below is able to satisfy.

And this other, which induces us to be charitable to men for our own interest:

When we study the world, we value only those men who possess sagacity; but when we study ourselves we esteem only those who have indulgence.

Round the cupola, in letters of antique bronze, should be inscribed the following:

A new commandment I give unto you, that ye love one another, as I have loved you, that ye also love one another. John xiii. 24.

To decorate the exterior of this temple with suitable dignity, there would be occasion for no other ornaments than those of Nature. The first rays of the rising sun, and the last beams of the setting luminary would gild its

* See Chardin's account of the Palace of Ispahan.

cupola, towering above the forests; by day the fires of noon, and by night the moon's mild radiance would throw its majestic shadow over the verdant turf; the Seine would repeat its reflexion in its waves; in vain the tempest would batter its enormous vault; and when Time should have covered it with moss, native oaks would issue from its antique walls, and the eagles of heaven hovering round, would repair to it for the purpose of building their nests.

Neither talents, nor birth, nor wealth should entitle any individual to a monument in this patriotic and sacred spot. But it may be asked, who is to decide on the merits of those whose remains shall be there deposited? The king alone should be the judge, and the people the reporter of them. To obtain this kind of renown, it would not be sufficient for a citizen to have cultivated a plant in a hothouse, or even in his garden; it must have been naturalized in the fields, and its fruits brought for sale to the market. It would not be enough that the model of an ingenious machine was in the cabinet of an artist, and that it had been approved by the Academy of Sciences; the machine itself ought to be in the hands of the people, and in common use. It would not be a sufficient proof of the merit of a literary work that it had been crowned by the French Academy; it must have been read by that class of persons for whom it is designed. Thus, for example, a patriotic ode would be reputed of no value, unless it were sung by the people in the streets. The merit of a military or naval officer should not be decided from the gazettes, but from the suffrages of the soldiers or sailors. The people, it is true, scarcely perceive in the citizens any other virtue than benevolence; they consult only their principal want; but their instinct in this particular is conformable to the divine law, for all the virtues, even those which appear the most remote, lead to this point; and if the rich were to seek to gain their affections by acts of kindness, that is precisely the disposition which we are

desirous of exciting in them. They would fulfil their duties, and the higher ranks would be more closely connected with the lower.

From such an institution would result the re-establishment of one of those laws of Nature which are of the highest importance to a nation; I mean an inexhaustible perspective of infinity, as necessary to the happiness of a people, as of an individual. Such is, as we have elsewhere seen, the nature of the human mind; if it discovers not infinity in its views, it recoils upon itself, and its powers are employed in its destruction. Rome presented to the patriotism of her citizens the conquest of the world; but this object was too limited: her last victory would have been the commencement of her ruin. The establishment which I propose is not attended with that inconvenience. There is not any object more important to man than his own end; and there are no monuments more varied and more pleasing than those of virtue. If but one single slab of Bretagne marble or Auvergne granite were placed every year in this Elysium, there would be novelty sufficient to keep the attention of the people perpetually engaged. The provinces of the kingdom would plead against the capital, to obtain a place there for their virtuous inhabitants. What an august tribunal might be formed of bishops, illustrious for their piety, upright magistrates, celebrated generals, to examine their different claims! How many memoirs would appear, calculated to interest the people, who see in the national library nothing but the death-warrants of notorious criminals, or the lives of saints which are beyond their comprehension! How many new subjects would be presented to our literary men, who are eternally citing the age of Louis XIV, or condescend to be the factors of the reputation of the Greeks and Romans! How many curious anecdotes for our rich voluptuaries! They pay extravagant sums for the history of an insect, engraved in every possible manner, and studied with a microscope, minute by minute, in all the pha-

ses of its life They would not derive less pleasure from an acquaintance with the manners of a poor charcoal-burner, bringing up his family in the paths of virtue in the forests, amid smugglers and banditti; or those of a wretched fisherman, who, to furnish delicacies for their tables, lives like a thrush in the midst of tempests.

I have no doubt that these monuments, executed with the taste of which we are capable, would attract to Paris a great number of wealthy foreigners. They now come hither to live; they would then come also to die. They would seek to deserve well of a nation which had become the arbitress of the virtues of Europe, and to obtain a last asylum in the sacred soil of the Elysium, of which all the virtuous and beneficent would be reputed citizens. This establishment, which might undoubtedly be formed in a manner very superior to the feeble sketch which I have here given, would tend to unite the higher and lower classes much more than even our churches, where avarice and ambition frequently introduce among the citizens distinctions more humiliating than any which exist in society. It would attract strangers to the capital, by offering to them the rights of citizenship, illustrious and immortal. Lastly, it would unite religion to the country, and the country to religion, the mutual ties of which are ready to be broken asunder.

I have no occasion to observe that this establishment would not cost any thing to the state. The people would defray the expence, and it might be maintained by the revenue of some rich abbey, since it would be consecrated to religion, and the recompence of virtue. It ought not, like the monuments of modern Rome, and even like many of our royal monuments, to be an object of emolument for individuals who sell a sight of them to the curious. By no means should people who are meanly dressed be banished and driven from it, as poor, honest, hard-working women in bed-gowns are excluded from our public gardens, while flaunting prostitutes parade with unblushing

impudence in the great alleys The lowest of the people should have access to it at all times. To you, O ye unhappy of every condition, would especially belong the sight of these friends of humanity, and your patterns in future would only be found among the statues of virtuous men! There a soldier, at the sight of Catinat, would learn to endure calumny; there a courtezan, weary of her miserable profession, would hang her head with a sigh on seeing the statue of Modesty honored; but at the sight of that of a female of her own condition, who returned to the paths of virtue, she would raise her eyes towards him who prefers repentance to innocence.

It may be objected that the people would soon destroy all these monuments. That this is the manner in which they scarcely ever fail to treat those which are uninteresting to them, I shall not attempt to deny. The spot would undoubtedly be placed under a police; but the vulgar respect monuments destined for their own use. They ravage a park, but they never destroy any thing in the fields. They would soon take the Elysium of their country under their protection, and would watch over it much more effectually than porters or guards.

More than one method might be adopted for rendering this place respectable and dear. It ought to be an inviolable asylum for all the unfortunate; for example, for fathers who owe for a months' nursing of their children, and for those who have committed slight and inconsiderate errors; every man should there be free from arrest, except by an express order of the king, signed with his own hand. There too industrious families, who want employment, might apply. There it should be forbidden to bestow alms; but it should be permitted to do good. Virtuous people, capable of distinguishing and employing men, would repair thither in quest of objects in whose favor they might exert their credit; others to honor the memory of some illustrious man, would give entertainments at the foot of his statue to some indigent family. The

state would set the example at certain epochs dear to the country, such as the birth-day of the king. It should there give repasts to the lower classes, not by throwing loaves at their heads, as in our public rejoicings, but by regaling them according to their respective trades, seated on the grass around the statues of those by whom they were invented or improved. These repasts would not resemble those given sometimes out of ceremony by the rich to the poor, in which they wait upon them respectfully with napkins under their arms. The donors should be obliged to sit down to table, and to eat with them. They would have no occasion to wash their feet, but they would perform a more useful service in providing them with shoes and stockings.

There the rich would learn to practise genuine virtue, and the poor to know it. The nation would there be instructed in its duties, and would acquire an idea of true greatness. It would behold the sacrifices offered up at the shrine of virtue to the Deity, turning in the end to the advantage of the wretched.

These repasts would remind us of the love-feasts of the first Christians, and of the saturnalia of death, towards which we are daily advancing, and which, rendering us all equal, will make no other difference between us than what results from the good which we may have done during our lives.

In order to honor the memory of virtuous men, the faithful formerly assembled in places consecrated by their actions or their tombs, on the banks of a stream, or in the shade of a forest. Thither they carried refreshments, and invited those who had none to partake with them. The same customs were common to all religions. They still subsist in those of Asia. You may discover them among the ancient Greeks. Xenophon, after his famous retreat, in which he saved ten thousand of his countrymen, and ravaged the territory of Persia, allotted part of the booty to the foundation of a chapel i h of Diana.

He attached to it a revenue, chaces, and repasts for those who should repair to it on a certain day in every year.

OF THE CLERGY.

If our poor sometimes participate in some paltry ecclesiastical distribution, instead of extricating them from their misery, it has no other effect than to keep them in it. And yet what vast landed property has been bequeathed for their relief to the church! Why are not its revenues distributed in sums sufficient to raise at least annually a certain number of families from indigence? The clergy assert that they are the managers of the property of the poor; but the poor are neither lunatics nor idiots to stand in need of their management; besides, it is impossible to prove by any passage either of the old or new Testament, that this duty belongs to the clergy: if these are the administrators of the poor, they have at present in the kingdom no less than seven millions of souls in their temporal administration. I shall not enlarge upon this reflexion. Every one ought to have his due: the priests are by divine right the advocates of the poor, but the king alone is their natural trustee.

As indigence is the principal cause of the vices of the people, opulence may, in its turn, produce depravity among the clergy. I shall not here call to my aid the censures pronounced by St. Jerome, St. Bernard, St. Augustin, and other fathers of the church, against the clergy of their age and country, in which they prophesied the total destruction of religion as a necessary consequence of their manners and their riches. This prophecy of several of them was speedily verified in Africa, in Asia, in Judea, and in the Grecian empire, where not only the religion but the very governments of those nations were overturned. The rapacity of most ecclesiastics soon renders the functions of the church suspected; this is an argument which strikes every person. "I believe," said Pascal, "the evi-

dence of witnesses who seal their testimony with their blood." This reasoning, however, is liable to objections; but the following is perfectly free from any: "I mistrust witnesses who enrich themselves." In truth religion has natural and supernatural proofs far superior to those which man is capable of furnishing. It depends not on our order or our disorder; but on these our country depends.

The world at present looks with envy, and it may even be said with hatred on most priests. But they are the children of their age as well as other men. The vices with which they are reproached belong in part to their nation, to the time in which they live, to the political constitution of the state, and to their education. Ours are Frenchmen like ourselves; they are our relations, frequently sacrificed to our own fortune by the ambition of our fathers. If we were charged with their functions, we should probably perform them much worse. I know none that are so painful and so highly entitled to respect as those of a good ecclesiastic. I say nothing concerning those of a bishop who watches over his diocese, who founds useful seminaries, who maintains order and peace among communities, who opposes the wicked and supports the weak, who is ever ready to succour the unfortunate, and who, in this age of error, refutes the objections of the enemies of the faith by his own virtues. He is rewarded by the public esteem. By painful exertions it is possible to purchase the glory of a Fenelon or a François de Paule. I say nothing concerning those of a rector, which, by their importance, sometimes attract the notice of kings, nor of those of a missionary who is going to martyrdom. The conflict of the latter lasts perhaps but for a single day, and his glory is immortal. But I speak of those of a simple and obscure parish priest, whom nobody notices. He is, in the first place, obliged to sacrifice the pleasures and the liberty of his youth to tedious and fatiguing studies. He is obliged to carry continence with him every day of his life, like a ponderous cuirass, in a thousand occasions

which it is liable to be lost. The world honors only theatrical virtues and victories of a moment. But to contend every day with an enemy lurking within one's self, and who approaches as a friend; to withstand continually, without witness, without glory, without praise, the strongest of passions, the darling propensity, is truly difficult. Conflicts of another kind await him from without. He is daily obliged to risk his life among epidemical diseases. He has to confess, with his head on the same pillow, persons afflicted with the small pox, the putrid, and the scarlet fever. This obscure courage appears to me far superior to military courage. The soldier fights in the sight of armies, to the sound of cannons and of drums; he presents himself to death as a hero. The priest, on the contrary, devotes himself to it as a victim. What does the latter expect from his exertions? A subsistence frequently precarious. Besides, when he acquires property he cannot bequeath it to his descendants. All his temporal hopes expire with him. What compensation does he receive from men? To have frequently to console persons destitute of faith; to be the refuge of the poor, and to have nothing to give them; to be persecuted sometimes even for his virtues; to see his conflicts treated with contempt, his proceedings turned into artifices, his virtues into vices, his religion into ridicule; such are the duties, and such are the rewards which the world bestows on the greater part of these men whose lot it envies.

This I have ventured to suggest for the happiness of the people, and of the principal orders of the state. Philosophers and politicians without number have declaimed against the vices of society, without taking the trouble to investigate the causes, and still less to seek remedies for them. The most skilful have beheld our miseries only in detail, and have applied to them nothing but palliatives. Some have proscribed luxury, others celibacy, and have been anxious to compel those to burden themselves with a family who are incapable of providing for their indivi-

dual necessities. Others have proposed the imprisonment of all beggars; and others again would prohibit prostitutes from appearing in the streets. They act like those physicians, who, to cure an eruption of the body, use all their art to make the humor strike internally. Politicians! ye apply the remedy to the head, because the pain is in the forehead, but the disease is in the nerves; it is the heart that demands attention; it is the people whom it is necessary to cure.

If some great minister, desirous of making us happy at home, and extending our power abroad, durst undertake the task, he ought in his proceedings to imitate those of Nature. She operates but slowly, and by reactions. I repeat it, the cause of the prodigious power of gold, which has, at one and the same time, robbed the people of morals and of a subsistence, lies in the venality of employments. That of mendicity, which at this day extends to seven millions of persons, proceeds from the vast domains and the numerous places accumulated by individuals. That of the prostitution of common women arises on the one hand from their indigence, and on the other from the celibacy of two millions of men. The useless superabundance of indolent and censorious citizens in our small towns, is owing to the impositions by which the inhabitants of the country are degraded; the prejudices of the nobility proceed from the resentments of the commonalty; and all these evils, with an infinite number of others both physical and intellectual, spring from the misery of the people. It is the indigence of the lower classes that produces such numbers of comedians, prostitutes, highwaymen, incendiaries, licentious writers, slanderers, flatterers, superstitious people, beggars, kept mistresses, quacks of every kind, and that infinite multitude of corrupt men, who, incapable of aspiring to distinction by means of virtues, seek to obtain a livelihood and consideration by their vices. In vain you oppose to them financial plans, projects of poor's rates, ordinances of police, decrees of parliament, all your

labor is in vain. The indigence of the people is a vast river, which increases every year, which overflows all the dykes, and will in the end bear down all before it.

To this physical cause of our wretchedness must likewise be added a moral cause, which is our education. I shall venture to make some reflexions on this subject, though it is above my ability; but if it be the most important of our abuses, it appears on the other hand, the easiest to reform; and this reform is, in my opinion, so necessary, that, without it, all the others would be unavailing.

STUDY XIV.

OF EDUCATION.

"TO what better purpose," says Plutarch,* "could Numa devote his attention, than to cause the children to be well fed, and the youth to be exercised, that they might not be different in manners nor turbulent from the diversity of their food, but might perfectly agree together, because in their infancy they were trained in the same track, and cast in the same mould of virtue? Besides, the other advantages with which this practice was attended, it served to maintain the laws of Lycurgus; for respect for the oath taken by the Spartans would have been of little avail, had he not, by training and nourishment, dyed in the wool, if I may be allowed the expression, the manners of the children, and caused them to suck in almost with their mothers' milk the love of his laws and his regulations"

Here is a judgment which condemns all our educations

* Plutarch's comparison of Lycurgus and Numa.

in the praises it bestows on that of Sparta. I have no hesitation to ascribe to our modern educations the turbulent, ambitious, malignant, officious, and intolerant spirit of most Europeans. The effects of them may be seen in the misery of the people. It is remarkable that those nations which have been most agitated internally and externally, are precisely those in which our vaunted education has been the most flourishing. The truth of this may be ascertained if we examine country by country, or age by age. Politicians have imagined that they had discovered the cause of the public misery in the different forms of governments. Nevertheless Turkey is tranquil, and England, is frequently agitated. Political forms, as we have already observed, are perfectly indifferent to the felicity of a state, provided the people are happy: we might have added, and provided the children likewise are happy.

The philosopher Laloubère, sent by Louis XIV. to Siam, says, in the narrative of his travels, that the Asiatics laugh at us when we extol the excellence of the Christain religion for securing the happiness of states. On reading our histories they ask, how our religion can possibly be so humane, when we make war ten times as often as they? What then would they say, were they to witness our perpetual law-suits, the slanders, and the calumnies of our societies, the jealousies of particular bodies, the quarrels of the common people, the duels of the higher classes, and our animosities of every kind? According to the testimonies of the missionaries themselves, there is nothing that can be compared to these, neither in Asia nor in Africa, neither among the Tartars nor the Savages. For my part, I conceive that the cause of all these individual and general vices lies in our ambitious education. When we have been accustomed to drink from childhood out of the cup of ambition, we thirst for the beverage all the rest of our lives, and this thirst degenerates into a fever at the foot of the altars.

Assuredly religion is not the cause of them. I know

not how kingdoms, assuming the character of Christain, could have adopted ambition for the basis of public education. Independent of their political constitution, which forbids it to all those of their subjects who have not money, that is to the majority, there is no passion which is so rigidly proscribed by religion. We have observed that only two passions reign in the human heart, love and ambition. The civil laws inflict heavy penalties on the excesses of the first; they repress as much as possible all its movements. Infamous punishments are decreed for prostitution, and in some places adultery is a capital offence. But these same laws encourage the second; they every where hold out to it rewards and honors. These opinions prevail even in convents. If the amorous intrigues of a monk happen to be discovered, the whole convent is an uproar; but what praises are lavished upon those which obtain him a cardinal's hat! What railleries, imprecations, and maledictions are poured forth against imprudent frailty! What flattering and honorable epithets are reserved for audacious cunning! By how many glorious names, such as noble emulation, love of glory, understanding, intelligence, merit rewarded, do they not palliate intrigue, flattery, simony, perfidy, and all the vices which in every state follow in the train of ambition.

Such is the judgment of the world, but that pronounced by religion, ever conformable to Nature, on the characters of these two passions is very different. Jesus calls to him the feeble Samaritan woman, pardons the adultress, absolves Mary Magdalen, who bathes his feet with her tears; but hear the sentence he denounces against the ambitious: "Woe unto you, Scribes and Pharisees, for ye love greetings in the markets, and the highest seats in the synagogues, and the chief rooms at feasts!* Woe unto you, also, ye lawyers; for ye lade men with burdens grievous to be borne, and ye yourselves touch not the burdens with

* Luke xxi. 46.

one of your fingers! Woe unto you, lawyers, for ye have taken away the key of knowledge; ye entered not in yourselves, and them that were entering in ye hindered!"† He declares, that notwithstanding their vain honors in this world, prostitutes shall take precedence of them in the kingdom of God. He enjoins us in several places to beware of them, and he informs us that we shall know them by their fruits. In judgments so different from ours, he judges our passions according to their natural conformities. He pardons prostitution, which is in itself a vice, but which, however, is only a weakness with respect to social order, and he condemns ambition without indulgence, as a crime against both the order of society and that of Nature. The first brings misery only on two culprits, the second on the human race.

To this our doctors reply, that the sole object in the education of our children, is to inspire them with the emulation of virtue. I believe, for my part, that exercises of virtue are never heard of in our colleges, unless the pupils have to compose a few themes or amplifications on that subject. But real ambition is instilled into their minds, when they are taught to aspire to the first places in their classes, and to adopt a thousand intolerant systems. Accordingly when they have once the key of science in their pockets, they are determined, like their masters, not to suffer any person to enter but by their door.

Virtue and ambition are incompatible. The glory of ambition is to ascend, and that of virtue to descend. See how Jesus reprimands his apostles, when they ask him which of them is to be the first. He takes a child, and places him in the middle of them. We may be assured it was not a child out of our schools. Ah! when he recommends to us humility so suitable to our feeble and miserable nature, it was because he knew that not even supreme power was capable of making us happy in this

† Luke xi. 46. 52.

world; and it is worthy of remark, that it was not to the disciple whom he most tenderly loved that he gave the precedence before the rest; but, as the reward of his love, which was faithful even unto death, he, with his expiring breath, bequeathed to him his own mother.

This pretended emulation, instilled into children, renders them, throughout their whole lives, vain, intolerant, affected by the slightest censure or commendation of a stranger. They are inspired with ambition, we are told, for their good, that they may attain to distinction in the world. But natural cupidity is fully adequate to that purpose. Have tradespeople, artisans, and all the lucrative professions, that is, all the conditions of society, occasion for any other stimulus? If ambition were instilled only into one child, destined at some future period to fill important offices, this education, which would not be free from disadvantages, would at least be suitable to the career he is to pursue. But, by inspiring all with this passion, you give each of them as many enemies as he has companions; you render them the instruments of unhappiness to each other. Those who have not talents to distinguish them, seek to ingratiate themselves with their masters by flattery, and to effect the fall of their associates by their slanders. Should these means prove unsuccessful, they conceive an aversion for the objects of their emulation, which only procures applause for their comrades, and is to themselves a perpetual source of vexation, punishment, and tears. This is the reason why so many banish from their memory the times and the objects of their early studies, though it is natural to the human heart to recollect with pleasure the period of childhood. I have no doubt that these antipathies of education have a powerful influence over the love which we ought to cherish for religion, because its elements are explained to us with anger, pride, and inhumanity.

The policy of most masters consists principally in fashioning the exterior of their pupils. They model after the

same form a multitude of characters which Nature has made very different. Some would have them grave and sedate, as if they were little Presidents; others, in much greater number, require them to be quick and lively. "Come," they are incessantly crying; "make haste; don't be lazy." To this impulsion alone I ascribe the general levity which characterizes our youth, and with which we are reproached as a national failing. It is the impatience of masters that originally produces this levity in scholars It is afterwards increased, on their entrance into the world, by the impatience of women. Is then reflection less useful in the affairs of life than promptitude? How many children are destined for grave occupations! Is not reflection the ground-work of prudence, of temperance, of wisdom, and of most of the moral qualities? For my part, I have always observed that honest people are exceedingly tranquil, and rogues extremely alert.

There is, in this respect, a wide difference between two children, one of whom has been educated in the paternal habitation, and the other in a public school. The first is, indisputably, more polished, more honest, less jealous, from this very reason, that he has been educated without the ambition of surpassing any one, and still less of surpassing himself, according to our fashionable phrase, which, like many others, is destitute of sense. Is not a child, filled with college emulation, obliged to renounce it, the moment he steps into the world, if he would be supportable to his equals and to himself? If he proposes to himself no other object than advancement, will he not be afflicted at the prosperity of another? Will he not cherish animosities, jealousies, and desires which will deprave both the physical and the moral man? Do not philosophy and religion oblige him to strive every day of his life to eradicate these vices of education? Nay, the world itself compels him to conceal their hideous aspect. This is a cheering prospect opened to human life, in which it is necessary to employ one half of our days in destroying

with a thousand efforts what we have been constructing with such pains and tears in the other.

These vices we have adopted from the Greeks, without reflecting that they contributed to their perpetual divisions, and their final ruin. Most of their exercises, at least, had for their object the welfare of their country. If the Greeks had matches for wrestling, boxing, throwing the disk, races on foot and in chariots, it was because these exercises were necessary for war. If they gave prizes for eloquence, it was because it served to defend the interests of their country, from city to city, or in the general assemblies of Greece. But of what service are our long studies of the dead languages, and of customs foreign to our country? Most of our institutions relative to the ancients, bear a striking resemblance to the paradise of the Indians of America. These good people say, that, after death the souls of their countrymen go to a certain region where they hunt the souls of beavers with the souls of arrows, running over the soul of the snow with the soul of snow-shoes, and that they cook the souls of their game in the souls of kettles. We have, in like manner, images of a Colyseum, in which no games are held; images of colonnades and public places, where nobody is permitted to walk; images of antique vases, which cannot hold any liquid, but which contribute greatly to our images of grandeur and patriotism. The Greeks and Romans of ancient times would here think themselves in the region of shades. Happy would it be for us had we borrowed of them nothing but vain images, and had we not naturalized among us their real evils, by transporting hither the jealousies, the animosities, and the vain emulations by which they were rendered miserable.

It was Charlemagne, we are told, who instituted our studies, some say for the purpose of dividing his subjects, and giving them employment: in this case he has succeeded to admiration. Seven years for humanity, two for philosophy, three for theology, twelve years of languor,

ambition, and self-sufficiency, without reckoning the additional years which fond parents keep their children at their studies, to render them the more perfect, as they say. I would ask, if at the expiration of this time, a scholar is, according to the denominations of those studies, more humane, more philosophical, and believers more firmly in God than the honest clown who cannot read? Of what advantage then is all this to the majority? What benefit do they receive from it in the world, for the perfection of their understanding and the purity of their diction? We have seen that the classic authors themselves derived their knowledge from the study of Nature alone, and that those of our nation who are most distinguished in the sciences and literature, such as Descartes, Michel Montaigne, J. J. Rousseau, &c. attained to such eminence only by deviating from the track of their models, and following that which was directly opposite. It was thus that Descartes attacked and overthrew the philosophy of Aristotle: you may say that it is precisely the sciences and eloquence which are past the barriers of our Gothic institutions.

It is nevertheless fortunate, I admit, for many children who have bad parents, that there are public schools: they are less unhappy there than under the paternal roof. The vices of their masters being exposed to view, are partly restrained by the fear of public censure; but this is not the case with those of their parents. For example, the pride of a man of letters is loquacious and sometimes instructive; that of an ecclesiastic is hypocritical, but flattering; that of a gentleman is haughty, but frank; that of a peasant is insolent, but natural: whereas the pride of a citizen is sullen and stupid; it is pride at its ease, pride in a *robe de chambre*. As a citizen is never contradicted, unless by his wife, they both concur to make their children unhappy, even without suspecting it. Is it possible to believe that, in a society in which all moralists agree that men are corrupted, in which the citizens are protected only by the dread of the laws or by the fear

they entertain of each other, weak and defenceless children are not abandoned to the discretion of tyranny? Nothing can be so shallow and so vain as most citizens; among them stupidity takes deep root: you see many of them, both men and women die of apoplexy, occasioned by a too sedentary life, by eating beef and taking meat-broth when ill, without suspecting in the least that this regimen is prejudicial to them. There is nothing so wholesome they say; they always saw their aunts do the same. It is thus that a multitude of false remedies and superstitions preserve the reputation which they have lost in the world; it is in their cupboards that cassia, a species of poison, still passes for a universal panacea. The regimen of the education of their unfortunate children resembles that of their health; they form them after gloomy customs; with rod in hand, they make them learn every thing even to the very scripture; they keep them sedentary the whole day, at an age when Nature impels them to move about for the purpose of expanding their members. Be good, say they to them incessantly; and this goodness consists only in sitting like statues. An intelligent lady, who was fond of children, one day saw in a shop in the Street St. Denis, a little boy and girl who were extremely silent and grave. "Your children are very dull," said she to the mother. "Ah! Madam," replied the woman, "it is not for want of being soundly beaten for it, I assure you."

Being rendered miserable in their plays and in their studies, children become gloomy hypocrites in the presence of their parents. At length they grow up. One night the daughter puts on her cloak, under the pretext of going to prayers, instead of which she hastens into the arms of her lover; symptoms of pregnancy appear; she flees the paternal habitation, and goes upon the town. One fine morning the son enlists. The father and mother are distracted. "We spared no expence in their education," they say; "we provided them with masters of every

kind." Ye fools! you forget the principal point, which was to win their affections.

They justify their tyranny by this cruel adage: "Correction is necessary for children; human nature is corrupt." They are not aware that it is themselves who corrupt it by their chastisements,* and that in every country where the parents are good, the children resemble them.

* I ascribe to this kind of punishment not only the physical and moral corruption of children, and of several orders of monks, but even of the whole nation. You cannot step into the streets without hearing nurses and mothers say to their children: "I'll whip you." I never was in England, but I am persuaded that the ferocity which is ascribed to the English must proceed from some such cause. I have indeed heard that this kind of punishment is more cruel and more frequent among them than in this country. See what is said on this subject by the illustrious authors of the Spectator, a work which has undeniably contributed to soften both their manners and ours. They reproach the English nobility for suffering this character of infamy to be impressed on their children. Turn to the 51st and 52d letters of the seventh volume. The former concludes with these words:

"I would not here be supposed to have said, that our learned men of either robe who have been whipped at school are not still men of noble and liberal minds; but I am sure they had been much more so than they are, had they never suffered that infamy."

The government ought to proscribe this kind of punishment, not only in public schools, as has been done in Russia, but also in convents, on board of ships, in private houses, and in boarding-schools; it corrupts at one and the same time the fathers, the mothers, the preceptors, and the children. I could mention dreadful reactions of it did not modesty forbid me. Is it not astonishing that men, in other respects of decent habits, should inculcate kindness, humanity, chastity as the ground-work of a Christian education, and yet inflict on bashful and innocent children the most cruel and the most obscene of all punishments? Our men of letters, who, during the past century, have reformed so many abuses, have not attacked this in the manner it deserves; they bestow not sufficient attention on the wrongs of the rising generation. It would be an interesting legal question to decide whether the state should suffer the punishment of infamy to be inflicted by men who have not the power of life and death. It is certain that the infamy of a citizen has more dangerous reactions on society than his death. It is of no consequence, we are told; they are but children. And because they are but children it behoves every generous mind to protect them, as an unhappy child infallibly becomes a wicked man.

It must not be supposed that what I have said concerning preceptors in general was with the intention of rendering them odious. I only wish to apprize them that these punishments, the practice of which they have borrowed from the corrupted Greeks of the Eastern Empire, contribute much more than they imagine to the hatred borne them, as well as the other ministers of religion, both monks and ecclesiastics, by the people, who are more enlightened than formerly. Preceptors, indeed, treat their pupils as they have been treated themselves: they were themselves unhappy, and render others so, often without being aware of it. All that I

I could demonstrate by a multitude of examples that the depravation of our most notorious criminals, from Guillery to Desrues, originated in the cruelty of their education. But we shall take leave of this odious perspective with this single reflection, that, if human nature were corrupt as those pretend who arrogate to themselves the power of reforming it, children would not fail to add new corruption to that which they find already introduced into the world on their entrance into it. Consequently human society would soon arrive at the period of its destruction. On the contrary, it is children who keep it at a distance, by bringing with them new and innocent souls. Long apprenticeships are necessary, to excite in them a propensity for our passions and our extravagancies. New generations resemble the dews and the showers of heaven, which refresh the waters of rivers, slackened in their course, and on the point of becoming putrid. Change the sources of a river, and you will change it throughout its whole course; change the education of a people, and you will alter their character and their manners.

We shall hazard some ideas on a subject of such importance, and we shall seek our elucidation of them in Nature. When we examine the nest of a bird, we not only find in it the food, adapted to her young; but by the softness of the down with which it is lined, by its situation which shelters it from cold, from rain, and from wind, and a multitude of other precautions, it is obvious that those who constructed it, exerted, for the benefit of their young, all the intelligence and the benevolence of which they were susceptible. Their father even sings at a little distance from their cradle, excited, in my opinion, rather by the solicitude of paternal than of conjugal love, for

contend for here is, that man has been abandoned to his own providence, and that all the evils he inflicts on his fellow-creatures recoil sooner or later on his own head. This reaction is the only counterpoise that can bring him back to humanity. All the sciences are still in their infancy; but that of making men happy has not yet made its appearance, even in China, a country whose political system is so superior to ours.

this last sentiment is extinguished in most of them as soon as the hen begins to sit. If we examine, under the same aspect, the schools of the children of men, we shall acquire a very unfavourable idea of the affection of their parents. Canes, rods, ferules, cries, tears, are the first lessons given to human life. We discover, indeed, some rewards among all these chastisements; but emblems of what awaits them in society, the pain that attends them is real, and the pleasure only imaginary.

It is worthy of remark, that of all the species of animated beings, the human species is the only one whose young are brought up by dint of blows. I should desire no other proof of original depravity in mankind. The European species surpasses all the nations of the globe in this respect, and likewise in wickedness. We have remarked, after the testimony of the missionaries themselves, the tenderness with which the savages educate their children, and the affection which the latter bear towards their parents. The Arabs extend their humanity even to their horses; they never strike them, but train them by means of caresses, and render them so docile that none in the world can be compared to them for beauty and excellence. They never tie them in their camp; but suffer them to graze at liberty in the neighbouring fields, from which they run at the call of their masters. These docile animals repair at night to their tents, and lie down in the midst of the children, without ever hurting any of them.* If the rider should fall, his horse immediately stands still, and never leaves him. These people have, by the invincible influence of a gentle education, rendered their horses the first coursers in the universe. It is impossible to read

* I have heard it remarked in the country, by persons of observation and veracity, that if a man were lying in the path of a horse, who was not urged, but suffered to take his own pace, the animal would not trample upon him, but step over with the utmost care, as if fearful of injuring the image of the Creator. The sceptic may laugh; but to the mind endued with sensibility, circumstances apparently so trivial carry conviction of an Intelligence, Almighty, All-bountiful, and All-wise. T.

without emotion what the virtuous consul d'Arvieux says on this subject in his tour to Mount Lebanon. A poor Arab of the desert had nothing in the world but a mare of extraordinary beauty: the consul of France, at Seid, proposed to him to sell her, intending to send her to Louis XIV. The Arab, oppressed by want, was long in coming to a determination; at last he consented, and asked a considerable sum. The consul durst not venture to give such a high price, till he had obtained the approbation of his court. Louis XIV. ordered it to be paid. The consul immediately sent for the Arab, who appeared mounted on his beautiful steed; and he counted out to him the sum he had demanded. The Arab, whose only covering was a wretched mat, dismounted, and looked first at the money, and then at the mare. "To whom," said he, with a sigh, "am I going to deliver thee? To Europeans, who will tie thee, who will beat thee, and make thee miserable. Come back with me, my beauty, my darling, my antelope, and be the joy of my children!" so saying, he leaped upon her, and galloped back to the desert.

If, among us, parents beat their children, it is because they love them not; if they put them out to nurse, as soon as they come into the world, it is because they love them not; if they send them, as they grow up, to boarding-schools and colleges, it is because they love them not; if they procure them situations out of their condition and their province, it is because they love them not; they keep them at a distance at every period of life, undoubtedly because they consider them as their heirs.

I have long sought the cause of this unnatural sentiment, not in our books, because their authors, to pay court to parents who purchase their works, treat only of the duties of children; and if they sometimes take notice of those of parents, those which they prescribe to them with regard to their children, seem only to suggest new means of making themselves detested by the latter.

This paternal apathy proceeds from our immorality,

which has destroyed among us all the sentiments of Nature. To the ancients, and even to the savages, the perspective of social life presented a succession of employments from infancy to old age, which, among them, was the age for important, civil, and ecclesiastical offices. The hopes of their religion then crowned the conclusion of their career, and rendered the plan of their life conformable to that of Nature. It was thus that they continually presented to the minds of their fellow-citizens that prospect of infinity so natural to the human heart. But venality and immorality having deranged among us the order of Nature, the only period of life which has retained its rights is that of youth and of love. It is this period to which all the citizens direct their thoughts. Among the ancients, it was the old who governed; among us, it is the young. The aged are obliged to resign employments of every kind. Their dear children then repay them the fruits of the education they have received.

Hence it comes, that a father and mother, fixing among us the period of their happiness, about the middle of life, behold with pain their children advancing towards that point at the time they are themselves receding from it. As their faith is nearly destroyed, religion affords them no consolation. They see nothing but death as the boundary of their prospect. This point of view makes them gloomy, severe, and often cruel. This is the reason why parents, among us, do not love their children, and why our old people affect so many frivolous propensities, that they may conciliate a generation which repulses them.

It is in consequence of these same manners that there is no patriotism among us. Among the ancients, on the contrary, that virtue shone with distinguished lustre. The ancients proposed not only great rewards for the present, but much greater for the future. The Romans, for example, had oracles, which promised that Rome should be the capital of the world, and which she actually did become. Each citizen individually flattered himself with the

idea of influencing her destinies, and of one day presiding, like a tutelary deity, over those of his own posterity. They were so ambitious of nothing as to see their age honored and distinguished above all those of the republic. Those among us who have any ambition for the future, confine it to the hope of being themselves distinguished from their age by their knowledge or their philosophy. Such are nearly the limits of our natural ambition directed by our education.

The ancients sought to divine what their posterity should become, and we strive to discover what our ancestors were. We are in the State like passengers carried by force on board of a ship; we look towards the poop, and not towards the prow, at the land we are leaving, and not towards that to which we are sailing. We eagerly collect Gothic manuscripts, monuments of chivalry, medals of Childeric; we preserve with care all these things used in the ancient manœuvres of our vessel. Looking behind us, we keep sight of them as long as we can. We even extend this love of antiquity to monuments that are foreign to us, to those of the Greeks and of the Romans. They are, like ours, the wreck of their ships, which have perished on the vast ocean of ages, without being able to keep together till our times. They would have accompanied, and would even have outstripped us, had they been well managed. They may still be known by their fragments. From the simplicity of its construction and the lightness of its shape, that is the vessel of Lacedæmon. She was formed to float for ever; but she had no keel; a violent storm arose, and the Helots could not restore her equilibrium. By the height of her quarter-deck you may know proud Rome. She was unable to sustain the weight of her high manœuvres; she was upset by her grandees. On the different rocks upon which they struck might be engraved the following inscriptions:

Love of conquest, Great Properties, Venality of Offices, Corruption of Manners; and, above all, Contempt of the common people.

The billows of time still roar over their vast wrecks, and from time to time detach fragments from them, which they disperse among living nations for their instruction. These ruins seem to address us in these words: "We are the relics of the ancient government of the Tuscans, of Dardanus, and the grandsons of Numitor. The states which they transmitted to their descendants still nourish nations; but they have no longer the same languages, the same religions, or the same dynasties of sovereigns. Divine Providence, to save mankind from shipwreck, drowned the pilots, and dashed the vessels in pieces."

We admire, on the contrary, in our frivolous sciences, their conquests, their vast and useless edifices, and all the monuments of their luxury, which are the very rocks upon which they split. This is the point to which we are led by our studies and our patriotism. If posterity concerns itself about the ancients, it is because the ancients have labored for its benefit; but if we do nothing for our posterity, it will certainly give itself no concern about us. It will direct its enquiries, as we are continually doing, to the Greeks and Romans, without bestowing a single thought upon its forefathers.

Instead of being enraptured with Roman and Greek medals, half consumed by time, would it not be quite as pleasing, and much more useful, to direct our views and our conjectures to our own children, fresh, brisk, and chubby, and seek to discover from their inclinations which of them will be the future servants of our country. Those who, in their sports, are fond of building, will one day erect monuments for it. Those who take delight in waging innocent wars with each other, will become Epaminondases and Scipios. Those who are seated upon the turf, the tranquil spectators of the pastimes of their companions, will one day give it grave magistrates and philosophers, masters over their passions. Those who, in their restless courses, are fond of straggling from the rest, will be celebrated travellers, and founders of colonies, who shall intro-

duce the language and the manners of France among the savages of America, or into the interior of Africa itself. If we are kind towards our children, they will bless our memory; they will transmit without alteration our customs, our fashions, our education, our government, and our memory to the remotest posterity. We shall be to them beneficent deities, who have rescued them from Gothic barbarism. We shall satisfy the innate predilection for infinity much better by directing our views two thousand years forward, than two thousand years backward. This manner of viewing objects more conformable to our divine nature, would fix our benevolence on sensible beings who exist and are to exist.* We shall secure for the days of our old age, which are so dull and so discouraging, the gratitude of the generation which will replace us, and by assuring its happiness and our own, we shall contribute with all our power towards the felicity of our country.

That I may contribute towards this happy revolution, I shall suggest a few other rapid ideas. I suppose that I have to find useful employment for a part of the twelve years which most of our young people waste in colleges. I reduce the time of their education to three periods, of three years each. The first shall commence at the age of seven years, as among the Lacedæmonians, and even

* There is a character of grandeur in the works of the Deity. They are not only perfect, but they go on continually increasing in perfection. We have said something of this law in treating of the harmonies of plants. A young plant is preferable to the seed which produced it, and a tree in flower, or in fruit, is more valuable than a young plant; lastly, a tree is never more beautiful than when it has grown old, and is surrounded with a forest of young trees sprung from its seed. The state of an embryo is better than nothing; and childhood than the state of an embryo; adolescence is preferable to childhood, and youth, the season of love, to adolescence. Man, in virile age, the chief of a family, is preferable to the young man. Old age, which encircles him with a numerous posterity, which, from his experience, admits him to the councils of nations, which suspends in him the empire of the passions only to give greater power to that of his reason, age, which seems to place him in the rank of the gods, by the multiplied hopes arising from the exercise of virtue and the laws of Providence, is superior to all the other periods of life. Would to heaven that this were the case with the age of France, and that the present century surpassed in happiness all those which have preceded it!

earlier: a child is susceptible of a patriotic education as soon as he is able to speak and walk. The second shall begin at the period of adolescence, and the third shall finish with it towards the completion of the fifteenth year, an age at which a youth may be of service to his country, and adopt a profession.

I would first place near the centre of Paris a spacious edifice, built internally in the form of a circular amphitheatre, divided by steps. The preceptors should be in the centre at the bottom, and above should be several rows of galleries, in order to multiply the places for the auditors. All round this building on the outside should be large porticoes for admitting the people. On the pediment over the entrance should be inscribed:

THE NATIONAL SCHOOL.

It is unnecessary to observe that as the children would pass three years in each period of their education, one of these edifices would be required for the instruction of the annual generation, which would fix the number of these structures destined for the general education of the capital at nine.

Around each of these amphitheatres there should be an extensive park, covered with plants and trees of the country, scattered at random, as if in the fields and in the woods. The primrose and the violet would be seen at the foot of the oak; and pear-trees and plumb-trees intermingled with elms and beeches. The bowers of innocence would not be less interesting than the tombs of virtue.

If I have wished that monuments should be erected to the glory of those who have enriched our climate with exotic plants, it is not because I prefer them to such as are indigenous, but to recal to the memory of my countrymen part of that gratitude which we owe to Nature. The most common plants in our fields, independent of their utility, are those which revive within us the most pleasing

sensations. They do not lead us abroad like foreign plants, but they keep us at home, and within ourselves. The feathered sphere of the dandelion brings to my recollection the places where, seated on the grass with children of my own age, we endeavoured to blow away at a single blast all those tufts, without leaving one behind. Fortune has blown in like manner upon us, and has dispersed our light circles over all the countries of the globe. It is not to the most beautiful flowers that we are most partial: moral sentiment in the course of time determines all our physical tastes. The plants which appear to me the most melancholy, are those which now excite the most powerful interest. I frequently fix my attention on a stalk of grass, on the top of an old wall, or a scabiosa battered by the winds in the midst of a plain. At the sight of an apple-tree without flowers and without fruits, in a foreign country, I have more than once exclaimed: "O why has fortune refused you, as well as me, a spot of ground in your native soil?"

The plants of our native land revive the idea of it in a more touching manner than its monuments; I should therefore spare no pains to collect them around the children of the nation. I would make their school as charming as their age, that, when the injustice of their patrons, of their friends, of their parents, of fortune, should have banished from their hearts all those motives of attachment to their country, the place where the years of childhood were rendered happy, might still be their capitol.

I would likewise decorate it with pictures. Children, as well as the common people, prefer painting to sculpture, because the latter has too many conventional beauties for them. They do not like figures entirely white, but with red cheeks and blue eyes, like their images of plaster. They are more struck with colors than with forms. I would have the portraits of our infant sovereigns exhibited there. Cyrus, educated with children of his own age, made heroes of them; ours would at least be educated

with the images of our kings. At the sight of them they would conceive the first sentiments of the attachment they owe to the fathers of their country. There too should be seen religious pictures; not such as produce terror and are intended to call men to repentance; but such as are proper for encouraging innocence. Such would be that of the Virgin Mary, holding the infant Jesus in her arms; and that of Jesus himself in the midst of children, manifesting in their attitudes and in their countenances the simplicity and confidence of their tender years, and such as Le Sueur would have painted them. Underneath might be inscribed these words of Christ himself:

Suffer little children to come unto me.

If it were necessary to represent in this school any act of injustice, it might be done in a picture of the barren fig-tree withering at his command. You would there see its leaves curled up, its branches twisted, its bark chapped, and the whole vegetable, struck with terror, perishing under the malediction of the Author of Nature.

Some short and simple inscription, taken from Scripture, such as the following, might be introduced:

Love one another.

or this:

Come unto me all ye who are weary and heavy laden, and I will give you rest.

And this maxim, which is necessary even for infancy:

Virtue consists in preferring the public welfare to our private interest.

And this other:

To be virtuous, we must resist our propensities, our inclinations, our tastes, and wage incessant war with ourselves.

But there are inscriptions to which scarcely any attention is paid, and which are of infinitely greater importance to children; these are their own names. Their names are inscriptions which they always carry with them. It is impossible to conceive the influence they have over their

natural character. Our name is the first and the last good which is at our disposal; it determines our inclinations from our very infancy; it is an object of our concern during life, and even after death. "I shall leave a name behind me," say we. It is names that confer lustre or dishonor on the earth. The rocks of Greece and Italy are neither more ancient nor more beautiful than those of other parts of the world, but we have a greater veneration for them, because they have finer names. A medal is only a piece of copper, frequently covered with rust, but which is decorated with an illustrious name. I propose then, that appropriate names be given to children. A child prides himself on his name. If it alludes to any vice, or has a tendency to ridicule, which is the case with many, the mind inclines that way. Bayle remarks that an inquisitor called *Torre-cremada*, which signifiest he Burned Tower, had burned during his life a prodigious number of heretics. A cordelier whose name was *Feu-ardent*, Burning Fire, did the same. It is another abuse to give children destined for pacific occupations, turbulent and ambitious names, as Cæsar and Alexander. It is still more dangerous to give them such as are ridiculous. I have seen unfortunate children teazed to such a degree by their companions, and even by their own parents, on account of their christian names, which convey certain ideas of simplicity and good-nature, that they gradually assumed an opposite character of malignity and ferocity. Of this there are numerous examples. Two of our most celebrated satirical writers in theology and poetry were called, the one *Blaise* Pascal and the other *Colin* Boileau. "There is nothing sarcastic in Colin," said his father; but this expression created a sarcastic disposition in him. The audacious villainy of Jacques *Clement* probably originated in some ridicule of his name. The government ought therefore to pay attention to the names which are given to children, since they have terrible influences on the characters of the citizens. I should likewise wish that to their

christian name might be added a surname of some family celebrated for its virtues, as was the practice of the Romans: this kind of adoption would attach the low to the high, and the high to the low. There were at Rome I know not how many Scipios among the plebeian families. The names of our illustrious families, such as our Fenelons, our Catinats, our Montausiers, should, in like manner, be revived among the common people.

In this school no noisy clocks should be employed to announce the different exercises, but the sound of flutes and hautboys. Every thing taught there should be in verse, and set to music. It is impossible to conceive the influence of these two arts united. Of this I shall cite a few examples taken from the legislation of the people, whose government was perhaps the most perfect of any that ever existed, I mean that of Sparta. Hear what Plutarch says on this subject in his life of Lycurgus. "Lycurgus, having left his country, (to avoid the calumnies which were the reward of his virtue,) first proceeded to Candia, where he attentively observed and considered the manners and government of that island, visiting and conversing with the most virtuous and most renowned of its inhabitants. If he found there some laws which appeared good, and was induced to carry them with him, for the purpose of introducing them into his own country, he likewise met with others of which he could not approve. Among the rest there was a man, who was accounted uncommonly wise and well versed in matters of governments, and whose name was Thales. Him Lycurgus persuaded by his entreaties and the friendship he had formed with him, to go to Sparta. This Thales had the reputation of being a Lyric poet, and assumed that title; but, in fact, he did every thing that could be done by the ablest governors and the most enlightened reformers of the world: for all his compositions were beautiful songs, in which he exhorted the people to live in obedience to the laws, and in union and concord with each other; the

words being accompanied with notes, gestures, and accents, full of sweetness and gravity, which secretly softened the stubborn hearts of the hearers, and inspired them with a love of virtue, and weaned them from the seditions, enmities, and divisions which at that time prevailed among them; so that it may be said that it was he who prepared the way by which Lycurgus afterwards led the Lacedæmonians to reason."

Lycurgus likewise introduced music into many of their exercises, among others into those of war. "When their whole army was ranged in order of battle, in sight of the enemy, the king sacrificed a goat to the gods, and then commanded the combatants to put chaplets of flowers on their heads, and those who played the flutes to strike up what was called the song of Castor, at the sound and cadence of which he himself began to march the first; so that it was a spectacle not less agreeable than tremendous, to behold them thus marching all together in good order, without confounding their ranks, and going steadily and joyfully to expose themselves to the perils of death."*

Thus, unlike modern nations, music served to repress their courage, rather than to excite it, and for that purpose they had no occasion for bear-skin hats, nor drums, nor spirituous liquors.

If music and poetry were such powerful means of recalling vicious men to the paths of virtue, and afterwards of governing them at Sparta, what influence would they not have over our children in the age of innocence! Who could ever forget the sacred laws of morality, if composed in verses as pleasing as the *Devin du Village!* Such institutions would produce among us poets as sublime as the sage Thales, or as Tyrtæus, who composed the hymn of Castor.

These means being established in behalf of our children, the first thing in which they ought to receive

* Plutarch's Life of Lycurgus.

instruction should be religion. Their preceptors should at first speak to them concerning God, in such a manner as to inspire them with love and awe, but awe, unmixed with fear. The fear of the Deity engenders superstition, and produces a horror of priests and of death. The first commandment of religion is to love God. "Love, and do what you please," was the expression of a saint. Religion enjoins us to love him above all things, and to address ourselves to him as to our father. If it commands us to fear him, it is only relatively to the love we owe him, for we ought always to be fearful of offending what it is our duty to love. For the rest, I am far from thinking that a child cannot have any idea of God before he has attained the age of fourteen years, as a writer, whom I love in other respects, has asserted. Do we not instil into very young children sentiments of fear, and hatred of metaphysical objects which have no existence? Why then should they not be inspired with confidence and love towards the Being who fills all Nature with his bounty? Children have not such an idea of God as the theologian or the philosopher, but they are extremely susceptible of the sentiment of the Deity, which, as we have seen, is the reason of Nature. Nay, this sentiment was exalted among them at the time of the Crusades to such a degree as to impel a great number of them to assume the cross, and to assist in the recovery of the Holy Land. Would to Heaven that I had preserved the sentiment of the existence of God, and of his principal attributes as pure as in the early period of my life! It is the heart rather than the understanding that religion demands. And let me ask which of the two is most filled with the Deity, and is most acceptable in his sight, the child, who, penetrated with the sentiment of him, raises his innocent hands towards heaven, and stammers forth his prayers, or the scholar who explains his nature?

It is extremely easy to excite in children ideas of God and of virtue. The daisy in the grass, the fruit suspended

from the trees in their play-ground, might be their first lessons in theology, and their first exercises in abstinence and obedience to the laws. Their attention should be drawn to the principal object of religion, by the pure and simple narrative of the life of Jesus Christ in the Gospel They might learn in their Creed all that it is possible to know of the nature of God, and in the Lord's Prayer all that they ought to ask of him.

It is worthy of remark, that among all the sacred books there is none which children learn with such facility as the Bible. They ought in particular to be exercised in the performance of the duties enjoined by it, without vain glory and the respect of mankind. They should, therefore be trained to vie with each other in acts of friendship, and in good offices of every kind. All the children of the citizens, without exception, should be admitted into this school. Nothing should be required of them but the greatest cleanliness, let them for the rest even be clothed only in rags sewed together. You would there see the child of the man of quality, attended by his tutor, arriving in a carriage, and placing himself beside the son of a peasant, supported by his little stick, lightly clad in the midst of winter, and carrying in his satchel his books, and a slice of brown bread for his subsistence during the whole day. They would then both learn to know each other before they separated for ever. The son of the rich man would learn to share his abundance with him who is often destined to feed him during his whole life out of his own scanty pittance. These children of all ages, having their heads crowned with flowers and divided into bands, should assist at our public processions: their youth, their order, their singing, their innocence, would exhibit a more august spectacle than footmen carrying their master' coats of arms fastened to tapers, and indisputably more touching than the files of soldiers and bayonets with which a God of peace is surrounded on those occasions.

In this school the children should be taught reading,

writing, and arithmetic. For this purpose ingenious men have invented simple, speedy, and pleasing methods; but the masters of schools have taken great pains to render them useless, because they destroyed their empire, and advanced the business of education too speedily for their profit. If you would teach children to read in a short time, put a sugar-plum on each of your letters, and they will soon know the alphabet by heart: and if you multiply and diminish the number, they will quickly learn arithmetic. For the rest, they will have reaped abundant benefit from this national school, if they leave it without knowing how to read, write, or cypher, if they are only deeply impressed with this truth, that reading, writing, arithmetic, and all the sciences in the world are nothing; but that to be sincere, virtuous, kind, to love God and man is the only science worthy of the human heart.

At the second epoch of education, which I suppose to commence about the age of ten or twelve years, when their intelligence becomes restless and they are eager to imitate every thing they see done. I would teach them in what manner a provision is made for the wants of society. I should not pretend to make them acquainted with the five hundred and thirty arts and trades which are carried on in Paris, but only with those which are subservient to the first necessities of life, such as agriculture, the different preparations of bread, the arts which our vanity denominates mechanical, such as the spinning of flax and hemp, the weaving of linen, and the construction of houses. To these I would join the elements of the natural sciences, which led to the invention of those arts, the rudiments of geometry, and the experiments of natural philosophy, which have not enriched those inventions, but which explain their processes with great parade. I would add to them a knowledge of the liberal arts, such as those of drawing, architecture, fortification, not to make them painters, architects, and engineers, but to shew them how houses are built, and how the country is defended. T

preserve them from the vanity which the sciences excite, I would demonstrate to them that among so many arts and professions, man has invented nothing, but that the whole is imitated either from the industry of animals, or from the operations of Nature; that his industry is a testimony of the wretchedness to which he is condemned, which obliges him to maintain an incessant conflict with the elements, with hunger and thirst, with his fellow-creatures, and, what is still more difficult, with himself. I would make them sensible of these relations of the truths of religion to those of Nature; and I would thus encourage in them a disposition to love the class of useful men who are incessantly providing for their necessities.

In the course of this education I would always study to make the exercises of the body and those of the mind go hand in hand. Accordingly, while they were acquiring a knowledge of the useful arts, I would teach them Latin. They would not learn it metaphysically and grammatically, as in our academies, to forget it again as soon as they have left them, but by habit. It is thus that it is learned by the greater part of the Polish peasants, who speak it all their lives, though they have never been at college. They speak it in a very intelligible manner, as I know from experience during my travels in their country; they have preserved this language, I believe, from the time of the Romans, and perhaps from Ovid; who was banished among their ancestors, the Sarmatians, and for whose memory they still cherish the greatest veneration. "It is not Cicero's Latin," say our scholars. But what of that? It is not because they are not sufficiently acquainted with the Latin tongue, that they cannot speak the language of Cicero, but because they are serfs, and understand not that of liberty. Our French peasants would not understand the best translations of that writer, were they even executed by members of the university. A Canadian savage would, however, comprehend them perfectly well and better than many professors of eloquence. It is the

tone of mind of the hearer that causes him to understand the language of the speaker. It was proposed, if I am not mistaken, during the reign of Louis XIV. to build a city where only Latin should be spoken, which would have infinitely abridged the study of that language; but undoubtedly the university would not have found its account in the execution of that plan. Be this as it may, I am well assured that no more than two years would be required by the children of the national school to learn Latin by practice, especially if in their lessons extracts were given them from the lives of celebrated Frenchmen and Romans, well written in Latin, and afterwards ably explained.

At the third epoch of education, about the age when the passions manifest themselves, I would point out their tender and pure language in the Eclogues and Georgics of Virgil, their philosophy in certain Odes of Horace, and pictures of their corruption in Tacitus and in Suetonius. I would complete the delineation of the horrible excesses into which man is plunged by them from some historian of the Eastern Empire. I would make them remark how talents, taste, knowledge, and eloquence declined among the ancients at the same time with morals and virtue. I would take good care not to fatigue them with these lessons. I would only shew them the most interesting passages, to excite in them a desire of becoming acquainted with the rest. My object would not be to make them go through the whole of Virgil, of Horace, or of Tacitus, but through a real course of the classics, by combining in their studies what men of genius have thought most proper for improving human nature. I would have them learn, in like manner, by practice, the Greek language, which is likely to be soon entirely unknown among us. I would make them acquainted with Homer, the *principium sapientiæ et fons*, as he is justly denominated by Horace; with Herodotus, the father of history; and with some of the maxims in the work of the divine Marcus Aurelius. I

would demonstrate to them that in every age, talents, virtues, great men, and republics flourished with the confidence in divine Providence. But to give greater weight to these everlasting truths, I would blend with them the enchanting studies of Nature, of which they would have seen but feeble sketches in the greatest writers.

I would draw their attention to the disposition of this globe, suspended in an incomprehensible manner from nothing, traversed and navigated by an infinite number of nations; I would make them observe in every climate the principal plants that are useful to human life, the animals that have relations to these plants, and the countries where they grow, but without enlarging on those subjects; and would then point out to them men, the only species of living beings scattered over the surface of the whole earth for the purpose of affording each other mutual assistance, and collecting at once all the productions of Nature. I would shew them that the interests of princes are the same as those of the human race, and that the interests of each nation are not different from those of their princes. I would treat of the various laws by which nations are governed, and teach them those of their own country, of which most of the citizens are ignorant. I would give them an idea of the principal religions which divide the earth, and would convince them how much superior the Christian religion is to all our political laws, and how admirably it is adapted to the happiness of mankind. I would make them sensible that it is this which prevents the different classes of society from clashing with each other, and which gives them equal strength under unequal burdens. These sublime considerations would kindle in their youthful hearts the love of country, which would be excited by the very spectacle of its miseries.

With these affecting speculations I would intermingle exercises useful, agreeable, and adapted to the vivacity of their age. I would make them learn to swim, not so much to teach them to escape themselves, if they should

chance to suffer shipwreck, as to succour those who may experience such a disaster. Whatever benefit they may themselves derive from their studies, I would never propose to them any other object than the welfare of their fellow-creatures. They would make a great progress if they reaped from them no other fruit than concord and the love of country. In summer, after the harvest, towards the beginning of September, I would take them into the fields, divided under several standards. I would give them an idea of war. I would make them sleep upon the grass, in the shade of the forests; there they should dress their own food; they should learn to attack and defend a post, and to swim across a river. They should exercise themselves in the use of fire-arms, and at the same time perform manœuvres taken from the tactics of the Greeks, who are our masters in almost every science. By these military exercises I would eradicate the partiality to fencing, which renders the soldier formidable only to the peaceful citizen, which is useless and detrimental in war, which has been condemned by many great generals, and, as Philopœmen said, is derogatory to courage. "When I was a child," says Michel Montaigne, "the nobility shunned the reputation of being good fencers, as injurious, and learned it with the greatest secrecy, as being science of subtilty, derogatory to genuine and native virtue."* This art, sprung from the hatred of the inferior against the superior classes of the same society by which they are oppressed, came to us from Italy, where it destroyed the military art. It is this that cherishes among us the spirit of duelling. This spirit did not originate among the northern nations, as many writers have asserted. Duels are very rare in Prussia and Russia; they are entirely unknown among the savages of the north. It came originally from Italy, as we may judge from the celebrated books on fencing, and the terms of that art,

* Montaigne's Essays, book 2, chap 27.

which are Italian, as *tierce, quarte,* and was naturalized among us, in consequence of the weakness and corruption of many women, who are pleased to find a bully in a lover. It is undoubtedly to these moral causes that we must ascribe the strange contradiction of our government, which prohibits duelling, but, at the same time, permits the public exercise of an art which teaches nothing else but to fight duels.* The national pupils should have a different idea of courage; and in the course of their studies, they should go through a course of human life, in which they would learn how they are one day to behave towards their fellow-citizens, and towards their enemies.

The season of youth would be agreeably and usefully spent amidst so many occupations. The mind and the body would be expanded at one and the same time. Natural talents, which lie dormant in the generality of men, would be called forth at the sight of different objects presented to them. More than one Achilles would feel his blood inflamed at the sight of a sword; more than one Vaucanson, on beholding a machine, would meditate how to organize brass and wood. All these attainments, it may be said, require, considerable time. True; but if we reflect on that which is lost in the colleges by tedious repetitions of lessons, by grammatical decompositions and explanations of the Latin tongue, which do not even give the scholar the facility of speaking it, and by the dangerous competitions of a vain ambition, it cannot be denied that we should make a better use of it. The pupils every day scrawl over as much paper as attor-

* Fencing-masters say that their art expands the body, and teaches people to walk. Dancing-masters assert the same of theirs. A proof that they are mistaken is, that they may both be known at first sight by the affectation of their gait. A citizen needs not to have either the attitude or the movements of a gladiator or of a Sybarite. But if the art of fencing is necessary, duelling should be publickly allowed, to relieve honest men from the cruel alternative of dishonoring themselves, either if they violate the laws of the state and of religion, or if they observe them. Indeed, the wicked among us are perfectly at their ease.

nies,* and the more uselessly, as, thanks to the art o. printing books, from which they copy the versions or the themes, they have no occasion for all that tedious labor. But how would the masters themselves employ their time, if the scholars were not to lose theirs?

In the national schools every thing should be conducted after the academic manner of the Greek philosophers. The pupils should study sometimes sitting, sometimes standing; at one time in the fields, at another in the amphitheatre, or in the park surrounding it. They would have no occasion for pens, paper, or ink; each should only carry with him the classic that was to be the subject of his lesson. I have frequently found from experience that we forget what we write. What I consign to paper, I wipe from my memory, and very soon from my recollection; this I have perceived in the case of whole works which I had written out fair, and which appeared as strange to me as if they had been executed by another hand. This is not the case with the impressions left upon our minds by the discourse of another, especially if it be accompanied with something striking. The tone of the voice, the gesture, the respect due to the speaker, the reflections of our neighbors, concur to engrave the words of a discourse much deeper than writing. I shall once more quote on this subject the authority of Plutarch, or rather of Lycurgus:

"But it must be particularly remarked, that Lycurgus wished none of his laws to be consigned to writing; this he expressly enacts in one of his ordinances that none of them should be written down; for he thought that what

* I am persuaded that if this plan of education, imperfect as it is, were adopted, one of the greatest obstacles to an universal reform of our knowledge and our manners would neither be the school-masters, nor academical institutions, nor the privileges of the university, nor doctor's caps. It would be the stationers who would see one of the most productive branches of their trade decline in consequence of it. For the privileges of the masters there would be happy and glorious compensations; but an objection on the score of money, in this venal age, seems perfectly unanswerable.

is particularly powerful and efficacious to render a city virtuous and happy, ought to be impressed by education on the hearts and manners of men, in order that it might never be erased. It is a virtuous disposition which is a much stronger tie than any other constraint that can be imposed upon men, and which causes each of them to serve as a law to himself.*

The minds of our young people would not then be fatigued in the national schools with a vain and loquacious science. Sometimes they would defend among them the cause of a citizen; sometimes they would express their sentiments on some public event. They would follow the progress of an art throughout its whole course. Their eloquence would be real eloquence, and their knowledge real knowledge. They would not employ themselves with the abstract sciences, or with vain researches, which are in general the fruits of pride. In the studies which I propose, every thing recals us to society, to concord, to religion and to Nature.

It is unnecessary to observe, that these different schools should be decorated in an appropriate manner, and that the circumference should serve for a place for the people to assemble and walk about, especially during the long nights of winter. They would there daily behold spectacles more proper to inspire them with virtue or the love of country, I will not say than those of the Boulevards or the dances of Vauxhall, but than the tragedies of Corneille.

Among these young people there would be neither rewards nor punishments, neither emulation nor envy. The only punishment inflicted there should be to banish from the assembly any one who disturbed, but only for a time proportioned to the fault of the culprit; this would be rather an act of police than of punishment, for no kind of disgrace should be attached to this exile. If you would

* Plutarch's Life of Lycurgus.

form an idea of such an assembly, imagine to yourself, instead of our youth at college, pale, contemplative, jealous, trembling for the success of their unfortunate compositions; imagine, I say, to yourself young people gay, contented, allured by pleasure into vast circular halls, over which are dispersed the statues of the illustrious men of antiquity and of their native land; observe them all attentive to the instructions of the master, assisting each other to comprehend them, to retain them, and to answer unexpected questions. This, in a whisper, suggests an answer to his neighbor, that makes an excuse for the negligence of his absent school-fellow. Represent to yourself their rapid progress in studies facilitated by intelligent masters, to pupils who mutually assist each other to retain what they hear. Figure to yourself science spreading amoug them like the flame in a pile of wood, all the pieces which are so arranged as to communicate with each other, and to take fire altogether. Observe, instead of a vain emulation, how union, good-will, friendship, spring up among them, for an answer seasonably suggested, for an excuse made in behalf of an absent youth by his neighbor, and for other services performed. The remembrance of these youthful connections would serve to unite them after their entrance into life, notwithstanding the prejudices of their conditions. It is at this tender age that gratitude and resentment are as profoundly engraved for the remainder of life, as the elements of the sciences and of religion. The case is very different in our colleges, where each pupil strives to supplant his neighbor. I recollect that one day I was extremely embarrassed because I had forgotten a Latin author, out of which I had a page to translate; one of my neighbors kindly offered to dictate to me the version he had made. I accepted his service very thankfully. I therefore wrote down his version, only altering a few words, lest my master should discover that it was the same as my neighbor's; but what he had given me was only a false copy of his translation, full of such

extravagant blunders, that my master was astonished, and immediately suspected that it was not my work, because I was not a backward scholar. I have not yet lost the recollection of this perfidy, though I have indeed forgotten others, still more cruel, since that time; but the early part of human life is the age for receiving impressions of resentment or of gratitude which can never be effaced. I even remember circumstances of a period still more remote. When I was in petticoats, I went to school, and sometimes lost my books through carelessness. We had a maid-servant whose name was Mary Talbot, who bought me new ones out of her own pocket, for fear I should be chastised at school. These little services made such a deep and durable impression on my heart, that, excepting my mother, there was not a person in the world for whom I entertained such a strong and permanent affection. This poor, good-natured creature was frequently included in my useless projects for making a fortune. I flattered myself with the hope of being able to repay her with usury, in her old age, when she was in a manner totally destitute, the tender cares she had bestowed on me when a child; but I scarcely had it in my power to give her some feeble and inconsiderable tokens of my good will. I mention these circumstances, though each of my readers may be in possession of still more interesting facts relative to others, or even to himself, to demonstrate to what a degree infancy would naturally be the season of virtue and of gratitude, were it not often depraved among us by the vices of our institutions.

But before these national schools were established, it would be necessary to provide men to superintend them. They should not be selected from among those who are the most strongly recommended. The more recommendations they had, the more intriguing they would be, and consequently the less virtue they would possess. It would not be asked: Is such a one a wit, a genius, a philosopher? but, does he love children? is he a man who visits the

wretched in preference to the great? is he a man of feeling? is he a virtuous man? From among men of that stamp masters should be provided for the public education; and I should farther wish that the title of master or doctor might be changed, as harsh and haughty. I would have their titles to signify the friends of children, the fathers of the country, and to be expressed by beautiful Greek words, for the purpose of adding to the respect for their functions the mystery of their titles. This class of men, destined to form the citizens of the nation, ought to be at least as noble and as distinguished as that of the equerries who train the horses of princes. A titled magistrate should preside every day in each school. It would be but just that the magistrates should cause the children, whom they are one day to judge and to govern as men, to be trained under their inspection in the paths of justice, and in the observance of the laws. Children are citizens in miniature. A nobleman of the highest rank should be invested with the general superintendance over the schools of the country, more important, beyond dispute, than that over the royal stud; and that men of letters, the vilest of flatterers, might not be tempted to advertise in the public papers the days on which they should *deign* to visit them, that sublime duty should be without a salary, and should procure only the honor of presiding there.

Would to heaven that I could make the education of women concur with that of men, as at Sparta! but this our manners forbid. I am of opinion, however, that there could be no inconvenience in associating young children of both sexes. Their society confers mutual graces; besides, the first elements of civil life, of religion, and of virtue are the same for one as for the other. This first epoch excepted, the girls should be taught nothing of what men ought to know, not that they may remain ignorant of it for ever, but that they may learn it with greater pleasure, and at a future period find their masters in their lovers. There is this moral difference between man and

woman, that it is the duty of the former to devote himself to his country, and of the latter to study the happiness of one man. A girl can never attain this end but by a taste for the occupations of her sex. You may fill her head with sciences of all kinds, and make her a philosopher and a theologian, but a husband is not pleased to find in his wife either a rival or a doctor of divinity. Among us books and masters early blight in a youthful female virgin ignorance, that flower of the soul so grateful to the senses of a lover. They rob married people of the sweetest charms of their union, and of those communications of amorous science and native ignorance so proper for beguiling the long days of wedded life. They destroy those contrasts of character which Nature has established between the two sexes, for the purpose of producing the most lovely harmonies.

These natural contrasts are so necessary to love, that there is not one female celebrated for the attachment with which she has inspired her lovers or her husband, who wed her empire to any other attractions than to the amusements and the occupations of her sex, from the time of Penelope to the present day. There are instances of the kind among women of all ranks and characters, excepting among the learned. These last have almost all been unfortunate in love, from Sappho to Christina queen of Sweden, and even nearer to our own time. It should therefore be in the company of her mother, her brothers, and her sisters, that a young female ought to acquire instruction in the future duties of a mother and a wife. It is in the paternal habitation that she should learn a great number of domestic arts, unknown at the present day to our well-educated women.

In this work I have more than once extolled the happiness of Holland, but as I only saw that country in travelling through it, I am unacquainted with the domestic manners of its inhabitants. So much, however, I know, that the women are constantly engaged in domestic con-

cerns, and that the greatest conjugal harmony prevails. But at Berlin, I beheld an image of the delight which those manners, though held in supreme contempt among us, are capable of producing in a family. A friend, whom Providence raised up for me in that city, where I was an utter stranger, took me into a company of young ladies; for in Prussia it is not the mistress of the house, but the daughter, who has parties and assemblies. This custom is observed in all the families which have not been corrupted by the manners of our French officers, who were prisoners there during the seven years' war. It is therefore common for the young ladies of the same society alternately to invite their friends, to take coffee with them, and Thursday is in general appointed for these assemblies. They repair with their mothers to the house of the young lady who gives the invitation. This last serves coffee with all kinds of pastry and confectionary of her own making. She presents them in the midst of winter fruits of every kind, preserved in sugar, with their colors, their verdure, and their perfumes, apparently as fresh as if they were still upon the trees. She receives from her companions a thousand compliments, which she repays with usury. But she soon displays other talents. At one time she unfolds to their view, on a large piece of tapestry at which she works night and day, forests of evergreen willows planted by herself, and streams of mohair which she has created with her needle. At another, she sits down to her harpsichord which she accompanies with her voice, and you would think she had assembled in her apartment all the songsters of the groves. She invites her companions to sing in their turn, and the commendations are then redoubled. Their mothers, filled with delight, are secretly gratified with the praises bestowed on their daughters. A few officers, in regimentals and in boots, escaping by stealth from their exercises, come to enjoy among them a moment of delicious tranquillity; and while each of the fair hopes to find in one of them her protector

and her friend, each soldier sighs for the partner who is one day to soften the rigor of military labors by the charm of her domestic talents. I never saw a country where the morals of the youth of both sexes are more pure, and where marriages are more happy.

There is no occasion to go so far as foreign countries to seek proofs of the power of love on purity of morals. I ascribe the innocence of those of our peasants, and their conjugal fidelity to this cause, that they are allowed to indulge this honorable sentiment at a very early age. It is love that makes them contented with their hard lot; it even suspends the woes of slavery. In the Isle of France I have frequently seen negroes exhausted with the fatigues of the day, set out at night to walk ten or twelve miles to see their mistresses. They meet them in the midst of a wood, at the foot of some rock, where they kindle a fire; they dance with them a part of the night, to the sound of their tantam, and return to their labor before day-break, contented, vigorous, and as fresh as those who have enjoyed the soundest sleep—such is the power of the moral affections combined with that sentiment over the physical organization! The night of the lover charms the day's labor of the slave.

There is in Scripture a very remarkable instance of this kind. It is in Genesis. "Jacob, it is there said, "served seven years for Rachel, and they seemed unto him but a few days, for the love he had to her."* I know that our politicians, who value nothing but gold and titles, are unable to comprehend this; but I have the satisfaction to inform them that none was more intimately acquainted with the laws of Nature than the authors of the sacred books, and that upon the laws of Nature alone can those of happy societies be established.

I should wish then that our young people might cultivate the sentiment of love amidst their labors, as did Jacob,

* Genesis xxix. 20.

It matters not at what age, for no sooner are they capable of feeling, than they are capable of loving. Honorable love soothes pain, banishes languor, prevents prostitution, and the errors and inquietudes of celibacy. It fills life with a thousand delightful perspectives, exhibiting in the future the most fortunate of unions: it strengthens in the hearts of two youthful lovers the partiality for study and for domestic occupations. What pleasure must a young man, passionately fond of science, derive from the repetition of its lessons to the beauty he loves! What joy must it afford to a young and bashful maiden to see herself distinguished among her companions, and to hear her lover extol the merits and the graces of her own industry! A youth destined at some future period to restrain from the bench of justice the crimes of men, is enchanted, amidst the mazes of the law, to behold his mistress embroidering for him the flowers that are to decorate the abode of their union, and to afford him an image of the beauties of Nature, of which gloomy honors are to deprive him for life. Another, who is to carry the torch of war to the extremities of the world, attaches himself to the feeling heart of his fair one, and flatters himself that the misery he will inflict on mankind, will be repaired by the good which she will do to the wretched. The bonds of friendship are multiplied in every house; between the lover and the brother who introduces him, and between the brother and the sister. Thus families become connected. The younger branches form their morals, and the happy prospects which they anticipate of their union, cherish in them the love of their duty and of virtue. Who can tell whether this liberty of choice, these pure and tender connections, would not fix that inconstant spirit which is thought to be natural to women? They would respect ties which themselves had formed. If, after marriage, they are desirous of pleasing all, it is because they are not permitted before marriage to love a single one.

If we might expect a happy revolution in the country,

it can only be effected by recalling the women to domestic manners. Notwithstanding all the satires which have been written against them, they are less culpable than men. They have scarcely any vices but what we communicate to them, and we have many from which they are free. As to those which are peculiar to them, it may be said that they have retarded our ruin, by making amends for the vices of our political constitution. It is impossible to conceive what would have become of society, abandoned to all the inconsistencies of education, to all the prejudices of our conditions, and to ambitions of every kind, had not woman crossed us in the way. Our history exhibits nothing but the declamations of monks against monks, of doctors against doctors, of one man of rank against another, of the noble against the commoner; and in the mean time crafty politicians strip us by degrees of our possessions. Had it not been for women, all these parties would in the end have made a desert of the state, and would have dragged the last of the common people to the slaughter-house or to the market, as it was advised to do some years ago. There were ages when we should all have been Cordeliers, coming into the world and expiring with the girdle of St. Francis: in others all knights errant traversing hills and dales with lance in hand; in others all penitents walking in procession through the cities and scourging ourselves; and in others *quisquis* or *quamquam* of the university. The sex, thrown out of their natural state by our unjust manners, turn every thing upside down, ridicule every thing, destroy every thing, great fortunes, the pretensions of pride, and the prejudices of opinion. Women have but one passion, which is love, and this passion has but one object; men, on the contrary, refer every thing to ambition which has thousands. Whatever may be the irregularities of women, they are always much nearer to Nature than we, because their predominant passion is continually drawing them closer to her, and ours, on the other hand, is removing us to a distance from her

A provincial, or even a Parisian tradesman, scarcely caresses his own children when they are somewhat grown up; but he bows very low to those of strangers, if they are rich, or people of quality. His wife, on the contrary, regulates her behavior by their figure; if they are homely, she takes no notice of them, but she will caress the child of a poor day-laborer if it is handsome. She will entertain a higher respect for a low-born man with silvery hair and a venerable aspect, than for a beardless counsellor Women attend only to the advantages of Nature, and men to none but those of fortune. Thus women, amidst all their irregularities, bring us back to Nature, while we, with all our pretended wisdom, are continually removing farther from her.

I admit, however, that while they have prevented the general calamity, they have caused among us an infinite number of particular evils. Alas! like ourselves, they will never find happiness but in virtue. In every country where virtue has ceased to reign, they are exceedingly wretched. In ancient times they were very happy in the virtuous republics of Greece and Italy, where they decided the fate of states; at the present day, reduced to the condition of slaves in the very same countries, they are obliged to prostitute themselves in order to procure a subsistence. Ours ought not to despair of us; they possess an unalienable empire over man.* We only know them by the name of the *sex*, to which we have given the epithet of *fair* by way of eminence; but how many other affecting epithets

* It is worthy of remark, that most of the names of the objects of Nature, of morals, and of metaphysics, are of the feminine gender, especially in the French language. It would afford matter of curious investigation to enquire whether the masculine names were given by women, and the feminine by men, to those things which are more particularly used by each sex, or whether the former were made of the masculine gender because they exhibit characters of strength and power, and the latter of the feminine because they presented characters of grace and loveliness. It is my opinion that men, having named in general the objects of Nature, have lavished upon them feminine denominations, from that secret propensity which impels them toward the sex. This may be remarked in the names borne by the celestial constellations, the four parts of the world, the greater number of rivers of kingdoms, of fruits, of trees, of virtues, &c.

might we not add to it, such as nutritive and consolatory. It is they who receive us on our entrance into life, and who close our eyes in death. It is not to beauty, it is to religion that women owe their principal power; the same Frenchman who sighs at Paris at the feet of his mistress, keeps her in chains and under the lash in St. Domingo. Our religion alone has viewed the conjugal union in the order of Nature; and among all the religions in the world, it is the only one that presents woman to man as a companion; the others abandon her to him as a slave. It is to religion alone that our women are indebted for the liberty they enjoy in Europe; and the liberty of the women led to the liberty of nations, and the proscription of a multitude of inhuman usages, diffused over every quarter of the globe, such as slavery, seraglios, and eunuchs. O charming sex! your power lies in your virtues. Save your country by recalling your lovers and your husbands to domestic manners, by the spectacle of your peaceful occupations: you would restore all society to its duties, were each of you to bring back one man only to the order of Nature! Envy not man his authority, his magistracies, his talents, his vain glory; but amidst all your weakness, surrounded by your wools and your silks, bless the Author of Nature for having conferred on you alone the power of being always good and beneficent!

RECAPITULATION.

At the beginning of this work I gave a view of the different paths of Nature which I proposed to pursue, for the purpose of acquiring an idea of the order which governs the world. I first stated the objections which have been made in every age against Providence, which afforded me an opportunity, while refuting them, to open new views of the disposition and use of the different parts of the globe. Thus, for example, I have referred the direction of the chains of mountains on continents to the regular winds

which blow upon the ocean; the position of islands to the conflux of its currents, or to those of rivers; the supply of volcanoes to the bituminous deposits on its shores; the currents of the sea and the movements of the tides to the alternate effusions of the polar ices. After this I have successively refuted the other objects relative to the vegetable and animal kingdom, by demonstrating that those kingdoms were no more governed by mechanical laws than the fossil kingdom. I have next proved that most of the miseries of mankind originated in the defects of our political institutions, and are not to be ascribed to Nature; that man was the only animal abandoned to his own providence, as a punishment for some original transgression; but that the same Deity who abandoned him to his own intelligence, still watched over his destinies; that he causes the miseries with which the governors of nations overwhelm the feeble and the low, to recoil upon their own heads; and I have demonstrated the action of a divine Providence by the very calamities of the human race. Such was the subject of my first part.

In the opening of the second I have attacked the principles of our sciences, by shewing that they mislead us either by the boldness of those same principles by which they ascend to the nature of the elements which elude them, or by the weakness of their methods, which embraces only one law of Nature at once, on account of the imbecility of our understanding and the vanity of our education, which teaches to consider the narrow paths we pursue as the only roads to knowledge. Thus the natural sciences, and even the political sciences which are the results of them, being separated among us, each of them has made, if I may be allowed the expression, a lane without a thoroughfare of the road upon which it entered. Thus it is that physical causes have, at last, made us lose sight of intellectual ends in the order of Nature; as financial causes have robbed us of the hopes of virtue and religion in the social order.

I have next sought a faculty better adapted to the discovery of truth than our reason, which is nothing more than our personal interest. This I flatter myself to have found in that sublime instinct called sentiment, which is in us the expression of natural laws, and is invariable among all nations. Through this medium I have examined the laws of Nature, not by tracing them up to their principles which are known only to God, but by descending to their results which are destined for the use of man. By following this track, I have had the satisfaction to obtain a glimpse of certain principles of the conformities and harmonies which govern the world. I have no doubt that it was by pursuing the same track that the ancient Egyptians so highly distinguished themselves for their attainments in the natural sciences, which they carried incomparably farther than we have done. They studied Nature in Nature herself, and not by piecemeal and with machines. Hence they formed a wonderful science, celebrated over the whole earth, under the name of magic. The elements of that science are now unknown; nothing of it remains but the name, which is given at the present day to the most stupid operations that the error and the depravity of the human heart can invent. Widely different was the magic of the ancient Egyptians, celebrated by the most respectable authors of antiquity, and even by the sacred writings. It was these principles of conformity and harmony that Pythagoras derived from them, which he brought to Europe, and which there became the sources of various branches of philosophy which appeared after his time, and even of arts which at that day were only just beginning to flourish; for the arts are merely imitations of the processes of Nature.

Though my inability is very great, these harmonic principles are so luminous, that they have not only presented to me dispositions of the globe entirely new; but they have likewise afforded me the means of discovering, at first sight, the characters of plants, and enabled me to say

at once: this is a native of the mountain, and that of the shores. By them I have demonstrated the use of the leaves of plants, and determined by the nautical or volatile forms of their seeds the relations which subsist between them and the places where they are destined to grow. I have observed that the corollæ of their flowers have positive or negative relations to the rays of the sun, according to the latitudes and the elevations at which they are to blow. I have next remarked the charming contrasts of their leaves, of their flowers, of their fruits, and of their stems, to the soil and the sky in which they grow, and those which they form from genus to genus, being, as it were, grouped two and two. Lastly, I have indicated the relations they have to animals and man, so that I may venture to affirm I have demonstrated that there is not a single shade of color thrown at random throughout the whole extent of Nature. By these views I have furnished the means of forming complete chapters of natural history, from having evinced that each plant is the centre of the existence of an infinite number of animals, which have conformities with it that are still unknown to us. Their harmonies might undoubtedly be extended still farther, for many plants seem to have relations not only to the sun, but to different constellations. It is not always a certain altitude of the sun above the horizon that sets their vegetative powers in motion. Many a plant flourishes in the spring, without putting forth the smallest leaf in autumn, though it is then exposed to the very same degree of heat. The same observation applies to their seeds, which sprout and shoot up in one season and not in another, though they have the same temperature. These celestial relations were known to the ancient philosophy of the Egyptians and of Pythagoras. We find various observations of this kind in Pliny; he says, for example, that towards the rising of the Pleïdes, the olive-trees and vines conceive their fruit; and after Virgil, that wheat ought to be sown on the retiring of that constellation and lentils on that of

Bootes; that reeds and willows should be planted when the constellation of the Lyre is setting. It was from these relations, the causes of which are unknown to us, that Linnæus formed with the flowers of plants a botanical almanac, of which Pliny suggested the first idea to the husbandmen of his time.* But we have indicated vegetable harmonies still more affecting, by demonstrating that the season of the expansion of every plant, of its flowering and of the maturity of its fruits, is connected with the developments and wants of animals, and particularly with those of man. There is not any but what has relations of utility to us either direct or indirect: but this immense and mysterious portion of human history will perhaps never be known, except to angels.

My third part presents the application of these harmonic principles to the nature of man. I have there shewn that he is composed of two powers, the one physical, the other intellectual, which affect him perpetually with two contrary sentiments, one of which is that of his misery, and the other that of his excellence. I have demonstrated that these two powers are most happily gratified at the different periods of the passions with the ages and occupations to which Nature has destined man, as agriculture, marriage, the settlement of posterity, religion. I have dwelt principally on the affections of the intellectual power, evincing that every thing which appears delightful and enchanting in our pleasures proceeds from the sentiment of infinity, or some other attribute of the Deity, which appears to our view at the extremity of our prospects. I have demonstrated, on the contrary, that the source of our miseries and of our errors arises from this, that in the social state we frequently cross these natural sentiments by the prejudices of education and of society so that we often apply the sentiment of infinity to the transient objects of the world, and that of our misery and

* See his Natural History book xvii. chap. 22.

weakness to the immortal plans of Nature. I have only skimmed the surface of this rich and sublime subject, but I may venture to assert that by pursuing this path, I have sufficiently proved the necessity of virtue, and have pointed out its real source; not where it is sought by our modern philosophers, that is, in political institutions, which are frequently contrary to it, but in the natural state of man and in his own heart.

I have afterwards applied, to the best of my ability, the action of these two powers to the happiness of society, by first shewing that most of our miseries are only social re-actions, all of which originate principally in overgrown property, in offices, in honors, in money, and in land. I have proved that these enormous properties are productive of the physical and moral indigence of a nation; that this indigence engenders in its turn a multitude of corrupt men, who employ all the resources of ingenuity and cunning to make the rich refund what their necessities demanded; that celibacy and the solicitudes with which it is accompanied, are, in a great number of citizens, the effects of that state of abject penury to which they are reduced; and that their celibacy produced by repercussion the prostitution of the women of the town, because every man who abstains from marriage, either voluntarily or by necessity, devotes a female to celibacy or prostitution. This effect necessarily results from one of the harmonic laws of Nature; since every male comes into the world and goes out of it with his female, or what amounts to the same thing, the two sexes of the human species are born and die in equal numbers. From these principles I have deduced several important consequences.

I have finally demonstrated that our maladies, physical and moral, proceed from the punishments, the rewards, and the vanity of our education.

I have suggested various ideas, in the view of supplying the people with abundant means of subsistence and population, and of reviving among them the spirit of religion

and patriotism, by presenting to them some perspectives of infinity, without which the happiness of a nation, like that of an individual, is negative and quickly exhausted, were it even founded on the most advantageous plans of finance, of commerce, and of agriculture. It is necessary to make a provision for man both as an animal and as an intellectual being. I have concluded these different projects with presenting a sketch of a national education, without which no kind of legislation or durable patriotism can exist. I have endeavoured to unfold in it at once the two powers of man, physical and intellectual, and to direct them towards them the love of country and of religion.

I have no doubt often gone astray in pursuing paths so new and so extended. I have frequently sunk below the subject, from the construction of my plans, from my inexperience, and from the very embarrassment of my style; but I repeat, that, provided my ideas suggest superior conceptions to others, I am satisfied. At the same time, if calamity be the road to Truth, I have not been destitute of the means to direct me towards her. The disorders of which I have frequently been the witness and the victim have suggested to me ideas of order. I have frequently met, in the journey of life, with great personages of high reputation and men belonging to respectable associations who had always in their mouths the words patriotism and humanity. I have approached them to enlighten myself from their intelligence and to place myself under the protection of their virtues; but I discovered them to be nothing but intriguers, whose private interest was their only object, and who soon persecuted me, because they found that I was not fit to be either the pander of their pleasures, or the trumpet of their ambition. I then ranged myself on the side of their enemies, thinking that I should there find the love of truth and of the public weal; but however varied may be our sects, our parties, and our associations, I met in all of them with the same men, only

clothed in a different garb. When both the one and the other found that I refused to become their partizan, they calumniated me after the perfidious manner of this age, that is, by pronouncing my panegyric. The times in which we live are highly extolled, but if we have on the throne a prince who emulates Marcus Aurelius, our age rivals that of Tiberius.

Should I ever publish the memoirs of my life, I should wish for no stronger proofs of the contempt which the glory of the world deserves, than to hold up to view those who are objects of it. At a time when, unconscious of having injured any one, after an infinite number of peregrinations, services, and fruitless labors, I was preparing in solitude these last fruits of my experience and of my industry, my secret enemies, that is, the men whose partizan I had refused to be, found means to deprive me of a gratuity which I received every year from the bounty of the prince. It was the only resource I possessed for the aid and subsistence of my family. This catastrophe was attended with ill health and domestic calamities which baffle description. I hastened, therefore, to gather the yet unripe fruit of the tree which I had cultivated with such perseverance, before it was blown down by the tempests.

But I wish no ill to any of my persecutors. If I am one day compelled to speak of their conduct towards me, it will only be with a view to justify my own. I even owe them obligations. Their persecutions have procured me repose; to their scornful ambition I am indebted for a liberty preferable to their grandeur. It is to them I owe the delicious studies to which I have devoted my attention. Providence has not abandoned me as they did. It has raised me up friends who served me, as opportunity offered, with my prince, and it will raise up others to recommended me to his favor, whenever it may be necessary. Had I reposed that confidence in God which I placed in men, I should have enjoyed uninterrupted tran-

quillity; the proofs of his providence in my behalf during the past ought to make me easy concerning the future. But, from a fault of education, the opinions of men have still too much empire over me. It is their fears, and not my own, which disturb me. Sometimes, however, I say to myself—Wherefore be embarrassed about the future? Before you came into the world did you give yourself any concern about the manner in which your members should be combined, and your nerves and your bones developed? When you afterwards emerged into light, did you study optics to know how you should perceive objects, and anatomy in order to learn how to move your body, and to promote its growth? These operations of Nature, far superior to those of man, took place in you without your knowledge, and without your interference. If you had no anxiety about being born, wherefore should you disquiet yourself about living? wherefore about dying? Are you not still in the same hand?

Other natural sentiments, however, afflicted me; for example, not to have acquired, after so many peregrinations and services, a single rural spot, where, in the bosom of repose, I might have arranged my observations on Nature, to me of all others the most amiable and interesting under the sun. Another source of still deeper regret proceeds from my not having united to my lot a partner, simple, gentle, sensible, and pious, who would have soothed my solicitudes much better than philosophy, and who, by giving me children like herself, would have provided me with a posterity much dearer than a vain reputation. I had found this retreat and this rare felicity in Russia, in the midst of an honorable employment; but I renounced all these advantages at the instigation of our ministers, to seek preferment in my native country, where I had nothing similar to which to aspire. Nevertheless, I may assert that my private studies have made amends for the first privation, in procuring me the enjoyment not only of a small spot of ground, but of all the harmonies diffused

throughout the vast garden of Nature. An estimable wife cannot be so easily replaced; but if I may flatter myself that this work contributes to multiply marriages, to render them more happy, and to soften the education of children, I shall consider my family as perpetuated in them, and the wives and children of my country as in some measure my own.

Nothing is durable but virtue. Personal beauty passes quickly away; fortune creates extravagant desires; grandeur is fatiguing; reputation is inconstant; talents and genius may be impaired: but Virtue is ever beautiful, ever diversified, ever equal and ever strong, because it is resigned to all events, to privations as to enjoyments, to death as to life.

Happy then, and a thousand times happy if I have contributed to redress some of the evils which afflict my country, and to open to it some new prospects of felicity! Happy if I have been enabled to wipe away, on the one hand, the tears of the wretched, and to recal, on the other, men misled by voluptuousness to that Deity towards whom Nature, time, our own miseries, and our secret affections propel us with such rapidity

In my opinion some favourable revolution is approaching. If it takes place, to the influence of letters we shall be indebted for it: though they are at the present day productive of little benefit to those who cultivate them, they nevertheless direct every thing. I say nothing concerning the influence they possess over the whole world, which is under the government of books. Asia is governed by the maxims of Confucius, the Corans, the Beths, the Vedams, and the like. But in Europe, Orpheus was the first that associated its inhabitants, and allured them from barbarism by his divine poesy. The genius of Homer afterwards produced the legislature and religious systems of Greece; it animated Alexander, and sent him forth to the conquest of Asia. Its influence extended to the Romans, who sought in his sublime productions the

genealogy of the founder and of the sovereigns of their empire, as the Greeks had sought in them the origins of their republics and of their laws. His august shade still presides over the poetry, the liberal arts, the academies, and the monuments of Europe; such is the power possessed by the prospects of the Deity which he has presented over the human mind! Thus the Word that created the world still continues to govern it; but when it had descended itself from heaven, and had shewn to man the path to happiness in virtue alone, a light more pure than that which illumined the islands of Greece burst forth in the forests of Gaul. Their savage inhabitants would have been the happiest of men had they enjoyed liberty; but they had tyrants, and these tyrants plunged them again into sacred barbarism, by presenting to them phantoms so much the more tremendous, because the objects of their confidence were converted into objects of their terror. The cause of human felicity and of religion itself was reduced to desperation, when two men of letters, Rabelais and Michael Cervantes arose, the one in France and the other in Spain, and shook at once the foundations of the monastic power* and of chivalry. To level these two colossal fabrics they employed no other implements than ridicule, that natural contrast to human terror. Like children, the people laughed and resumed their courage. they no longer felt any other impulsion towards happiness than those which their princes chose to give them, if their princes had then been capable of feeling any. Telemachus appeared, and that work recalled Europe to the harmonies

* God forbid that I should be thought to intend any insinuation against persons truly religious. Supposing that the members of monastic institutions possessed no other merit than that of passing through life without doing mischief, they would be respectable in the eyes of incredulity itself. I allude here not to persons of unfeigned piety, who have quitted the world in order to cherish, without interruption, the spirit of religion; but to those who merely assume a habit consecrated by religion, for the purpose of obtaining the honors and the riches of the world; to those against whom St. Jerome thundered so vehemently in vain, and who verified his prophecy in Palestine and in Egypt, in bringing religion into disgrace by their immorality, their avarice, and their ambition.

of Nature. It produced a great revolution in politics. It brought back the nations and their sovereigns to the useful arts, to commerce, to agriculture, and, above all, to the sentiment of the Deity. This work combines with the imagination of Homer the wisdom of Confucius. It was translated into all the languages of Europe. It was not in France that it excited the highest admiration: there are provinces of England where it is still one of the books in which children are taught to read. When the English entered the Cambraisis with the allied army, they wished to carry the author, who resided there far from the court, to their camp, to do him the honor of a military festival; but his modesty refused this triumph: he concealed himself. I shall add but one trait in praise of him: he was the only man living of whom Louis XIV. was jealous, and he had reason to be so; for while he was endeavouring to excite the fear and admiration of Europe by his armies, his conquests, his banquets, his buildings, and his magnificence, Fenelon was commanding universal admiration by a book.*

* It is absurd to institute a comparison between Bossuet and Fenelon. I am not capable of appreciating their merit, but the second appears to me far superior to his rival: he fulfilled, in my opinion, the two points of the law: *He loved God and man.*

The reader will not be displeased at being told what J. . . Rousseau thought of Fenelon. Having one day taken a walk with him to Mont Valerian, when we had reached the summit of the hill, we resolved to ask a dinner of the hermits, for payment. We arrived at their habitation, a little before they sat down to table, and while they were still at church. Rousseau proposed to me to step into the church, and to join in their devotions. After we had offered up our prayers to God in a little chapel, and while the hermits were proceeding to their refactory, Rousseau said to me with emotion: "I now experience what is said in the Gospel. *Where two or three are gathered together in my name, there am I in the midst of them.* There is here a sentiment of peace and of happiness which penetrates the soul. I replied: "If Fenelon were alive, you would be a Catholic." He exclaimed in extacy, and with tears in his eyes: "O! if Fenelon were alive, I would strive to get into his service as a lacquey, in the hope of meriting the place of his valet-de-chambre!"

Having met, some time ago on the Pont Neuf, with one of those little urns which the Italians sell about the streets for a few pence, I conceived the idea of erecting with it, in my solitude, a monument to the memory of Jean Jacques and of Fenelon, after the manner of those which the Chinese set up to the memory of Confucius. As there are two little escutcheons on this urn, I inscribed upon the one J. J. ROUSSEAU, and upon the other F. FENELON. I then placed it about six feet from the floor, in a corner of my cabinet, and affixed near it the following inscription:

Many learned men, inspired by his genius, have changed the spirit of our government and of our manners. To their works we are indebted for the suppression of many barbarous customs, such as that of punishing with death the pretended crime of witchcraft, of subjecting all criminals without distinction to the torture, the abolition of the relics of feudal slavery, the custom of wearing swords in the midst of cities and in time of peace, with many others. It is to them we owe the revival of the love of Nature and her duties, or at least the images of them. To many infants they have restored the nipple of their mothers, and they have kindled in the rich the love of a country life, which now impels them to quit the heart of cities and to reside in the suburbs. They have inspired

A la gloire durable et pure
De ceux dont le genie eclaira les vertus,
Combattit à la fois l'erreur et les abus,
Et tenta d'amener le siècle à la nature.
Aux Jean Jaques Rousseau aux François Fenelons
J'ai dédié ce monument d'argile,
Que j'ai consacré par leurs noms
Plus augustes que ceux de César et d'Achille.
Ils ne sont point fameux par nos malheurs;
Ils n'ont point, pauvres laboureurs,
Ravi vos bœufs ni vos javelles;
Bergeres, vos amans; nourissons, vos mamelles;
Rois, les etats où vous regnes:
Mais vous les comblerez de gloire,
Si vous donnez à leur memoire
Les pleurs qu'ils vous ont epargnés

To the pure and never-fading glory
Of those whose virtues were illumined by genius,
Who feared not to attack errors and abuses,
And endeavored to recal mankind to Nature.
To Jean Jaques Rousseau and François Fenelon
I have dedicated this monument of clay,
Which I have consecrated by their names,
Far more august than those of Cæsar and of Achilles.
They have not acquired fame by spreading devastation;
They did not, O ye poor husbandmen!
Seize your oxen and plunder your barns.
Rob you, ye shepherdesses, of your lovers, ye sucklings, of your teats,
Nor, ye kings, did they ravage your dominions!
But you will confer on them the highest glory,
If you bestow on their memory
The tears which they have spared you.

the whole nation with a taste for agriculture, which has usually degenerated into fanaticism whenever it has become the spirit of a party. It is they who have strengthened the bonds of unity between the nobility and the common people, with whom, it is true, the former were before connected by the alliances of finance: they have recalled them to their duty by those of humanity. They have directed all the powers of the state and even the women towards patriotic objects, by decking them with charms and with flowers.

O men of letters! without you the rich would have no intellectual enjoyment; their wealth and their honors would be a burden to them. You alone remind men of their duties to their fellow-creatures, and to the Deity. Wherever you appear, whether in the military, in the clergy, in the laws, in the arts, a divine intelligence is manifested, and the human heart sighs. Ye are at once the eyes and the light of nations. We should now probably be much nearer happiness, had not many of you, from a desire to please the multitude, misled it by flattering its passions, and by mistaking their deceitful voices for that of human nature.

See how ye have yourselves been misled by these same passions, because ye have associated too much with the world. It is in solitude or in the company of each other that your talents communicate reciprocal illumination. Recollect the time when a La Fontaine, a Boileau, a Racine, a Moliere lived among you. What is now your situation? The world, whose passions you flatter, arms you against each other. It consigns you to glory, as the Romans exposed unhappy wretches to wild beasts. Your sacred lists are transformed into the *arenæ* of gladiators. Without being aware of it, ye are the instruments of the ambition of bodies. It is by means of your talents that their chiefs obtain wealth and honors, while ye remain in obscurity and indigence. Recollect the glory of men of letters among nations emerging from barbarism; they

presented virtue to them, and became their gods. Think of their degradation among those that sunk into corruption, they flattered their passions, and fell victims to them. During the decline of the Roman empire, letters were exclusively the portion of a few Greek freedmen. Let the multitude run after the rich and the voluptuous. What do you propose to yourselves in the sacred career of literature, unless to march under the banner of Minerva? What respect would the world shew you, were you not covered with her sacred Ægis? It would tread you under foot. Let it deceive its adorers; place your confidence in heaven, whose succour will reach you wherever you may be.

The vine one day complained, weeping, to heaven of the injustice of her lot. "I am planted," said she, among parched rocks, and am obliged to produce fruit replenished with juice, while the reed in the valley, which produces nothing but dry down, grows at its ease, on the bank of the stream." "O vine," replied a voice from heaven, complain not of thy destiny. Autumn will come, when the reed shall perish without honor on the brink of the morass; but the rains of heaven shall refresh thee in the mountains, and thy juice, ripened among rocks, shall console men, and rejoice the gods."

We farther entertain a strong hope of reformation from the affection we cherish for our kings. Among us the love of country is nothing but love of the prince. It is the only tie that unites us and that, more than once has prevented us from separating. On the other hand, the people are the real monuments of kings. All those monuments of stone, by which many princes think to eternize their memory, frequently serve only to render it detested. Pliny says that the Egyptians of his time cursed the memory of the kings who had erected the pyramids, though they had forgotten their names. The modern Egyptians say that they were constructed by the devil, undoubtedly from the sense of the labor and pain which they must

have cost. The common people of our own country often ascribe the same origin to our ancient bridges and high roads cut through rocks which tower above the clouds In vain medals are struck for them, they understand neither their emblems nor their inscriptions. But it is on the hearts of men that an impression should be made by benefits conferred; the stamp of these can never be erased. The people have forgotten those monarchs who presided at councils, but they still cherish the memory of those who supped with millers.

The people love in their prince only one single quality, that is popularity, for thence spring all the virtues for which they have occasion. An act of justice performed unexpectedly and without ostentation for a poor widow, or a charcoal-burner, excites their admiration and their joy. They look upon their prince as a god, whose providence is every where vigilant; and they are right, for a single circumstance of this nature, which happens at a seasonable time, keeps all oppressors in awe, and fills all the oppressed with hope. In our days venality and pride have raised between the people and the king a thousand impenetrable barriers of gold, of iron, and of lead. The people can no longer approach the prince, but the prince may still descend to his people. On this subject kings have been filled with fears and prejudices. It is however very remarkable that among the great number of kings and princes of all nations who have been the victims of different factions, not one has perished while doing good, going about on foot or *incognito;* but that all of them have been sacrificed either in their carriages or at table, in the bosom of pleasures; in the midst of their court, of their guards, and in the very centre of their power.

We see in our days the Emperor and the King of Prussia travelling in a simple carriage, with one or two attendants, and without guards, through their widely-dispersed dominions, though inhabited in part by foreigners and conquered people. The great men and the most

illustrious princes of antiquity, such as Scipio, Germanicus, Marcus Aurelius, travelled without retinue on horseback, and frequently on foot. How many provinces of his kingdom did not our great Henry IV. visit in the same manner, in an age of factions and disturbances!

A king should be to his dominions as a sun to the earth, where there is not a single diminutive plant but what receives in its turn the influence of his rays. How many important truths are withheld from our kings by the prejudices of courtiers! How many pleasures they forego by their sedentary life! I allude not to those of grandeur, when they behold the people running in crowds to the high roads as they pass by, the ramparts of cities appearing all on fire with the lightning of their artillery, and squadrons issuing from their ports to cover the sea with flags and with flames. I suppose them to be weary of the pleasures of glory, but I consider them sensible to those of humanity, of which they are perpetually deprived. They are always forced to be kings, and are never permitted to be men. What pleasure it must afford them to conceal their grandeur like gods, and to appear in the midst of a virtuous family, like Jupiter in the habitation of Philemon and Baucis! How little it would cost them to make some of their subjects happy every day! What they bestow on a single family of courtiers, would often be sufficient to confer felicity on a whole province. Their appearance alone would frequently strike terror into all the tyrants there, and would console the unhappy. If they were known no where, they would be supposed to be every where. A faithful friend and a few robust attendants would be sufficient to procure them all the pleasures and to obviate all the inconveniences of travelling.

They possess the power of varying the seasons at pleasure without passing the boundaries of their kingdom, and of extending their enjoyments as far as their authority. Instead of residing in country-houses on the banks of the Seine, or amidst the rocks of Fontainebleau, they might

have palaces on the shores of the ocean and at the foot of the Pyrenees. They might, if they please, spend the burning months of summer embosomed in the mountains of Dauphiné, surrounded by an horizon of snow; the winter in Provence, beneath olive-trees and green oaks; the autumn in the ever-verdant meads and under the apple-trees of fruitful Normandy. They would behold mariners of every nation landing on the shores of France, English, Spaniards, Swedes, Dutch, Italians, all exhibiting the costumes and the manners of their respective countries. Our kings have in their palaces theatres, libraries, green-houses, cabinets of natural history; but all these collections are only vain images of man and of Nature. They possess no gardens more worthy of them than their kingdom, no libraries more instructive than their people.

Ah! if it be possible for a single individual to be upon the earth the hope of mankind, it is a king of France. He reigns over his people by affection, his people over Europe by manners; Europe over the rest of the world by power. Nothing prevents him from doing good when he pleases. In spite of the venality of places, he can humble haughty vice, and exalt depressed virtue. He can still descend to his subjects, or raise them up to him. Many kings have repented of having placed their confidence in treasures, in allies, in bodies of men, and in the great; but none ever regretted having entrusted his cause to his people and to God. Thus reigned the popular Charles V. and St. Louis. Thus will you, O Louis XVI. one day reign! From your accession to the throne, you have issued laws for the re-establishment of morals, and what was still more difficult, you have set the example of virtue in the midst of a French court. You have destroyed the relics of feudal slavery, ameliorated the condition of unfortunate prisoners, mitigated punishments civil and military, given to the inhabitants of certain provinces the liberty of dividing among them the national imposts, relinquished to the nation your lawful claim on your

accession to the crown, ensured to the poor sailors a portion of the fruits of war, and restored to men of letters the natural privilege of reaping the benefit of their exertions. While with one hand you relieved the unfortunate of the nation, with the other you erected statues to its celebrated men of past ages, and you succoured the oppressed Americans. The wise men who surround you, and, what is still more, the charms and the sensibility of your august consort, have rendered the path of virtue more easy to you. O great king! if you proceed with constancy along that rugged path, your name will one day be invoked by the unhappy of every nation. It will preside over their destinies, even during the lives of their own sovereigns. They will place it as a barrier against their tyrants, and hold it up as a model to their good kings. From the east to the west it will be revered like that of a Titus or of an Antoninus. When all living nations shall have ceased to exist, your name shall still live, shall still flourish with a glory ever new. The majesty of ages will add to its veneration, and the remotest posterity will envy us the happiness of having lived under your laws. I am nothing, sire. I may have been the victim of public evils, and be ignorant of their causes. I may have treated of the means of remedying them, without knowing the power and the resources of great kings. But if you make us better and more happy, future Tacituses will study after your example the art of reforming and of governing men at a difficult period. Other Fenelons will one day speak of France during your reign as of happy Egypt under Sesostris. Then while you are receiving upon earth the invariable homage of men, you will be their mediator with the Deity, whose most perfect image you will have been among us. Ah! if it were possible that we could lose the sense of his existence by the corruption of those who ought to set us an example, by the turbulence of our passions, by the mistakes of our own understandings, by the multiplied evils of humanity, then, O king! it will be your glory to

preserve the love of order in the midst of general disorder. The nations oppressed by lawless tyrants, would crowd to the foot of your throne, and would seek in you that God whom they no longer perceived in Nature.*

* Many a reader will undoubtedly perceive in this concluding apostrophe a larger portion of the spirit of adulation than of the spirit of philosophy. It likewise affords a striking example of the shortsightedness of human reason. A very few years after this prophetic eulogium on Louis XVI. proceeded from the pen of M. de St. Pierre, that unfortunate monarch, and almost his whole family, were immolated by his own sanguinary subjects, and every vestige of their existence was swept from the face of the earth. T.

SUPPLEMENT.

I SHALL here introduce, by way of Supplement, a few reflexions which would perhaps have been more properly placed in the Introduction; but, as this edition was printed from the fourth in 12mo, I did not think fit to make that transposition.

The reader may recollect that I explain the direction of our tides in summer towards the north, by the counter-currents of the general current of the Atlantic Ocean, which, at that season, descends from our pole; the ices of which are partly melted by the action of the sun that warms it for six months. I supposed that this general current which then runs to the south, being confined between Cape St. Augustine and the entrance of the Gulph of Guinea in Africa, produced on either side counter-currents, which occasion our tides that ascend toward the north along our coasts. These counter-currents actually exist in these same places, and are always produced on each side of a straight through which passes a current. But I had no occasion to suppose the re-actions of Cape St. Augustine, and of the entrance of the Gulph of Guinea, to make our tides ascend very far toward the north. The mere action of the general current of the Atlantic, which descends from the north pole and runs toward the south, by displacing a great volume of water, which it repels to the right and to the left, is sufficient to produce along its current those lateral re-actions which give rise to our tides that ascend northward.

On this subject I quoted two observations, the first of which is adapted to the comprehension of every reader. It is that of a spring, which, running into a basin, produces on the sides of that basin a counter-current, that carries back straws and other floating bodies to the spring itself. The second observation is extracted from the History of New France by Father Charlevoix. He relates, that, though he had a contrary wind, he proceeded at the rate of eight full leagues a day on lake Michigan, against the general current, by the aid of its lateral counter-currents.

But M. de Crevecœur, author of the Letters of an American Farmer, goes still farther; for he assures us that in ascending the Ohio along its banks, he proceeded 422 miles in fourteen days, which is more than ten leagues a day, "by means of the counter-currents," says he, "which always have a velocity equal to that of the principal current." This is the only observation I have to add, on account of its importance, and the esteem which I entertain for its author.

Thus the general effect of the tides is placed in the clearest light, by the example of the lateral counter-currents of our basins into which springs discharge themselves; of those of the lakes that receive rivers; and of those of the rivers themselves, notwithstanding their falls, which are considerable; without having any necessity for a particular strait to effect these re-actions along the whole extent of their shores, though straits considerably augment these counter-currents.

In fact, the course of our tides towards the north in winter cannot possibly be explained as an effect of the lateral counter-currents of the Atlantic Ocean, which descends from the north, since its general current proceeds at that season from the south pole, the ices of which are melted by the sun. But the course of these tides towards the north may be still more easily conceived from the immediate effect of the general current of the south pole, which proceeds direct north. In that direction, this southern current passes almost always from a wider into a narrower space, first running between Cape Horn and the Cape of Good Hope; and ascending to the bays and mediterraneans of the north, it

drives before it the whole volume of the waters of the Atlantic Ocean, without suffering a column to escape either to the right or to the left. If however, it were to meet in its way with some cape or strait that impeded its course, it cannot be doubted that a lateral counter-current, or tides running in a contrary direction, would there be formed. This is, accordingly, the effect produced at Cape St. Augustin in America, and above the gulph of Guinea, to the tenth degree of north latitude in Africa; that is, in the two places were those two quarters of the globe approach nearest to each other: for, in the summer of the south pole, the currents and the tides so far from taking a northern direction below those two points, return southward from the coast of America, and run eastward from Africa, along the whole gulph of Guinea, contrary to all the laws of the lunar system.

I could fill a volume with new proofs in favor of the alternate fusion of the polar ices, and of the elongation of the earth at the poles, which are consequences of each other; but I have quoted in the preceding part of this work more than sufficient to confirm those truths. The very silence of academies on subjects so important, is a proof that they have no objection to adduce against me. Had I been wrong in my correction of the strange error which led them to conclude that the poles of the earth are flattened, from geometrical operations, which evidently demonstrate that they are elongated, abundance of journals, most of which are devoted to their interest, would have come forward to silence a recluse. I have found but a single one that has ventured to bestow on me its approbation. Among so many literary powers, which contest the empire of opinions, and cruize on their tempestuous seas, endeavouring to sink every thing that does not appear under their colours, a foreign journalist hoisted in my behalf the flag of insurrection. This was that of Deux-ponts, whom I name according to my custom of publicly acknowledging private services, though this was performed rather for truth than for me, who am personally unknown to this writer, so estimable for his impartiality.

On the other hand, if academies ve not explained themselves, we must consider the embarrassment they would feel to retract publicly a geometrical inconsistency already so ancient and so universally adopted. They cannot approve my results without condemning their own; and they cannot condemn mine because they are justified by their own labors. I was not less embarrassed myself, when, publishing my observations, I was reduced to the alternative of chusing between their esteem and their friendship; but I was impelled by the sentiment of truth, which ought to overbalance all political considerations. My reputation, I confess, likewise engaged my attention, though only the smallest portion of it. Public utility was my principal object. I employed neither ridicule nor enthusiasm against celebrated men, surprized in error. I was not intoxicated by the discovery of that error. I approached them as I would have approached Plato, asleep on the brink of a precipice, fearful of their awaking, and still more apprehensive of the continuance of their slumbers. I have not ascribed their blindness to any want of light, a reproach so sensibly felt by the learned; but to the dazzling of their systems; and, above all, to the influence of education and moral habits, which veil our reason with so many prejudices. In the introduction to my first volume, I have described the origin of this error; and have given a geometrical refutation of it in the explanation of the plate annexed to the Fourth Study.

To convince one's self that the poles of the earth are elongated, there is no necessity to resolve some problem of transcendental geometry, filled with equations, such as the squaring of the circle; but the most common notions of the elements of geometry and physics are sufficient. Before I collect the proofs I have already given, and subjoin new ones, I shall say a few words concerning the means by which we may ascertain the truth, as much for my own instruction as for that of my critics.

We float on the bosom of ignorance, like mariners in the midst of a boundless ocean. We discover here and there a few truths, scattered like islands. To take observations

of islands in the open sea, it is not sufficient to find their distance to the north or to the east. Their latitude gives an entire circle, and their longitude another; but the intersection of those two measures precisely determines their situation. In like manner, truth cannot be ascertained but by considering it under various aspects. For this reason, we are much better acquainted with an object which we can submit to the examination of all our senses, than another which admits the application of no more than one. Thus, we know much more of a tree than of a star, because we see and touch the former; the flower of the tree affords us more knowledge than the trunk, because we can farther examine it with the sense of smelling; and finally, our observations on the fruit are still more numerous, because we taste it; and can examine it with four senses at once. With respect to objects towards which we direct only one of our organs, as that of sight, we cannot acquire a knowledge of these, except by surveying them under different aspects. That tower, say you, at the horizon, is blue, small, and of a circular form. You approach, and find it white, large, and angular. You then conclude that it is square; you walk round it, and find that it is pentagonal. You judge it impossible to measure its height without an instrument, because it is very lofty. Take an accessible object of comparison, that of your own shadow to your height; you will find the same proportion between the shadow of the tower and its elevation, which you judged it impossible to obtain.

Thus, the knowledge of any truth is acquired only by considering it in different points of view. On this account, therefore, God alone is truly wise, because he alone knows all the relations that exist between things: and nothing is so universally known by all beings as God, because the relations which he has established manifest him in all his works.

All truths form links of one chain. We cannot learn to know them but by comparing one with the other. If the academicians had followed this principle, they would have discovered that the flattening of the poles was an error. They needed only to have applied its consequences to the

distribution of the seas. If the poles are flat, their radii being the shortest of any part of the globe, all the seas must repair thither as to the lowest part of the earth: on the other hand, if the equator is protuberant, all the seas must retire from it, and the torrid zone must exhibit a belt of parched land, elevated six leagues and a half at its centre, since the radius of the globe at the equator exceeds by so much the radius at the poles, according to the academicians.

Now the configuration of the globe presents facts the very reverse; for the oceans of the greatest extent and depth are precisely under the equator; and, towards the north pole, the land stretches far away to the north, and the seas which it incloses are nothing but mediterraneans that are full of shoals.

The south pole is, indeed, surrounded by a vast ocean; but, as Captain Cook could not approach nearer than 475 leagues, we are ignorant whether there are lands contiguous to it. It is, farther, probable, as I have elsewhere observed, that Nature, who contracts and balances all things, has made amends for the elevation in land of the north pole, by an equivalent elevation in ice at the south pole. Cook actually found the icy cupola of the south pole much more extensive and more elevated than that which covers the north pole; and he even thinks that no comparison ought to be formed between them. Hear what he says, when prevented from penetrating beyond the 71st degree south, by one of its solid extremities, which resembled a chain of mountains towering one above the other, and hiding themselves in the clouds:

"There never were seen, in my opinion, mountains of ice such as these in the seas of Greenland; at least, I have never read or heard of the like: no comparison, therefore, can be stated between the ices of the north and those of the latitudes which I am mentioning." (*Cook's Second Voyage, January*, 1774.)

This prodigious elevation of ice, of which Cook saw only the extremity, may, then, counterbalance the elevation of the land of the north pole, proved by the labors of the

academicians themselves. But, though the frozen seas or the south pole are inaccessible to the operations of geometry, we shall presently see, from two authentic observations, that the fluid seas by which it is surrounded are more elevated than those of the equator; and that they are on the same level as the seas of the north pole.

Let us now verify the elongation of the poles by the same method as was used to demonstrate their being flattened. This last hypothesis has acquired a new degree of error, by being applied to the distribution of the lands and seas of the globe; that of the elongation of the poles will obtain new degrees of certainty by being extended to different harmonies of Nature.

Let us for this purpose collect the proofs scattered through the preceding volumes. These are both geometrical, geographical, atmospherical, nautical, and astronomical.

1. The first proof of the elongation of the earth at the poles is geometrical. I introduced it into the explanation of the plate of the Atlantic Hemisphere, in the first volume; and this alone is sufficient to give the utmost degree of certainty to this truth. It may be very easily conceived that if, in a circle, the degrees of one portion of this circle are lengthened, the entire portion of the circle must also be lengthened. Now the degrees of the meridian are lengthened under the polar circle, since they are larger there than under the equator, according to the academicians: consequently, the polar are of the meridian, or what amounts to the same thing, the polar curve is lengthened also. I have already employed this argument, which is unanswerable, to prove that the polar curve is not flattened; I may certainly be allowed to use it also to prove that it is elongated.

2. The second proof of the elongation of the earth at the poles is atmospherical. It is well known that the elevation of the atmosphere continues decreasing the higher you ascend a mountain. Now this elevation likewise diminishes as you proceed towards the pole. On this subject I have two experiments with the barometer; the first for the northern, the second for the southern hemisphere. The ba-

rometer at Paris falls one line at the height of eleven fathoms, and it likewise falls one line in Sweden, at the elevation of only ten fathoms, one foot, six inches, and four lines. The atmosphere of Sweden is therefore lower, or, in other words, its continent is higher than at Paris. The earth must therefore be elongated towards the north. This experiment, and its consequences, cannot be rejected by academicians, for they are extracted from the History of the Academy of Sciences for the year 1712.

3. The second experiment on the depression of the atmosphere at the poles, was made towards the south pole. It is a series of barometrical observations made every day in the southern hemisphere by Captain Cook, in the years 1773, 1774, and 1775, from which it appears that the mercury scarcely ever rose above 29 inches, beyond the 60th degree of south latitude, and was almost always at 30, and even higher, in the vicinity of the torrid zone; which proves that the barometer falls in advancing towards the south pole, as well as towards the north, and that, consequently, both the one and the other are elongated.

The table of these barometrical observations may be seen at the end of Captain Cook's second voyage. Those of the same kind which were collected in the subsequent voyage, exhibit no regular difference, let the latitude of the vessel be what it will: this proves their inaccuracy, occasioned probably by the disorder which must have been produced by the successive death of those who took the observations; that is, of the learned Anderson, the surgeon of the ship, and the particular friend of Cook; of that great man himself, and his successor Captain Clerke; and perhaps also by some zealous partisan of Newton, who was solicitous to throw a cloud over facts so contrary to his system of the flattening of the poles.

4. The fourth proof of the elongation of the poles is nautical. It is composed of six experiments of three different species. The two first experiments are taken from the annual descent of the ices of each pole towards the line; the two next from the currents that proceed from the poles during their summer; and the two last from the rapidity

and extent of those same currents; which make the circuit of the globe alternately for six months: three are for the north pole, and three for the south pole.

The first experiment, relative to the descent of the ices of the north pole, is quoted in the first volume of this work, in Study IV. I have there referred to the testimonies of the most celebrated navigators of the north—among others of Ellis, an Englishman; of Linschoten and Barentz, Dutchmen; of Martens, a Hamburger; and of Denis, the French Governor of Canada; who attest that these ices are of prodigious height, and that they are frequently found in spring in very temperate latitudes. Denis asserts that they are higher than the turrets of Notre Dame; that they sometimes form floating chains more than a day's sail in length, and that they advance as far southward as the great bank of Newfoundland. The northernmost part of this bank scarcely extends so far as the 50th degree; and the mariners employed in the whale fishery never find solid ice in the north till they reach the 75th degree. But, supposing this solid ice extends in winter from the pole to the 65th degree, the floating ice which is detached from it would traverse 375 leagues in the two first months of spring. It is not the wind that wafts them to the south, for the fishing vessels that meet them frequently have a favorable wind. Variable winds would drive them indiscriminately to the north, to the east, or to the west; but it is the currents of the north that constantly carry them towards the line, because the pole whence they come is more elevated.

5. The second experiment of the same kind, for the South Pole, is extracted from Cook's second voyage, in 1772. "On the 10th of December, at eight in the morning, we discovered ice to the westward of us, and," adds Forster, "a large mass about two leagues on the weather-bow, which had the appearance of a white head-land, or a chalk-cliff. In the afternoon we passed another large cubical mass, about two thousand feet long, four hundred feet broad, and at least as high again as our main-top-gallant-mast-head, or two hundred feet high." Cook was then in latitude 51° and longitude 2° west of the Cape of Good

Hope. He saw many other islands of ice till the 17th of January, 1773, but being at that time in 65° 15′ south latitude, he was stopped by a mass of broken ice, which prevented his farther progress to the south. Supposing, then, that the first ice he met on the 10th of December, departed from that point the 10th of October, the season at which I suppose that the action of the sun begins to dissolve the ices of the south pole, it must have advanced fourteen degrees, or 350 leagues, towards the line in two months; so that it must travel the same distance in the same space of time as the ices which descend from the north pole. The south pole, then, as well as the north, is more elevated than the equator, since its ices descend towards the torrid zone.

6. The third nautical experiment, demonstrating the elongation of the north pole, is deduced from its currents themselves, which issue directly from the bays and straits of the north, with the rapidity of sluices. On this subject I have quoted the same navigators of the north, Linschoten and Barentz, sent by the Dutch to discover a north-east passage to China; and Ellis, dispatched from England in quest of a north-west passage to the South-Sea, at the bottom of Hudson's Bay. At the extremity of these northern seas they found currents, which issued from the bays and straits at the rate of eight or ten knots an hour, carrying along a prodigious quantity of floating ice, and tumultuous tides, which, as well as the currents, rushed directly from the north, north-east, or north-west, according to the bearing of the land. From these invariable and multiplied facts, I am convinced that the effusion of the polar ices is the secondary cause of the motion of the seas, the sun being the primary cause; and hence I have formed my theory of the tides.

7. The currents of the South Sea in like manner originate in the ices of the south pole. Hear what Cook says on this subject, in his journal, January 1774:—"Indeed the majority of us were of opinion that this ice extended to the pole, or that it might possibly join some land, to which it has adhered from the earliest times; that, to the south of this parallel are formed all the ices which we found here

and there to the north; that they are afterwards detached by violent gusts of wind, or by other causes, and thrown to the north by the currents, which in high latitudes we always observed to bear in that direction."

This fourth nautical experiment, therefore, proves that the south pole is elongated as well as the north pole, for if both were flattened, the currents would set in towards them, instead of proceeding towards the line.

These southern currents are not so violent at their source as the northern, because they are not like them cooped up in bays, and afterwards disgorged by straits, but we shall find that they extend quite as far.

8. The fifth nautical proof of the elevation of the poles above the horizon of all seas, is founded on the rapidity and the length of their currents, which make the circuit of the globe. The reader may see the extent of my researches and of my proofs, in the Explanation of the Plate of the Atlantic Hemisphere. I first mentioned the current of the Indian Ocean, which flows six months toward the east, and six months toward the west, according to the testimony of all the navigators of India. I have shewn that this alternate and half-yearly current cannot, by any means, be ascribed to the course of the sun and of the moon, which always move from east to west, but to the combined heat of those luminaries, which melt for six months alternately the ices of each pole.

I have afterwards adduced two very curious observations, to prove that a similar half-yearly and alternate current exists in the Atlantic Ocean, where no such thing has hitherto been suspected. The first is that of Rennefort, who, on leaving the Azores, in the month of July 1666, found the sea covered with the wrecks of a sea-fight, which had taken place nine days before, off Ostend, between the English and the Dutch. These wrecks had in nine days travelled 275 leagues towards the south, which is at the rate of more than 34 leagues a day; and this is the fifth nautical experiment which proves the considerable elevation of the pole above the horizon of the seas by the rapidity of the currents of the north.

9. My sixth nautical experiment demonstrates, in a particular manner, the elevation of the south pole by the extent of its currents, which in winter force their way to the extremities of the Atlantic. It is the observation of Mr. Pennant, a celebrated English naturalist, who relates that the mast of the Tilbury man of war, burned at Jamaica, was thrown by the sea upon the coast of Scotland, and that the seeds of plants, which grow no where but in Jamaica, are annually picked up on the shores of the Scottish islands.

Cook likewise assures us in his voyages, as an undoubted fact, that a quantity of the large, flat, round seeds, called ox-eyes, which thrive only in America, are found every year on the coasts of Iceland.

10. and 11. The astronomical proofs of the elongation of the poles are three in number. The two first are lunar. These consist of the two-fold observation of Tycho Brahe and Kepler, who, in the central eclipses of the moon, saw the shadow of the earth elongated at the poles. I have quoted it in volume I. Study 4. It is impossible to object to the ocular testimony of two astronomers of such high celebrity, whose calculations, instead of being favored, were deranged by their observations.

12. The third astronomical proof of the elongation of the poles is solar, and relates to the north pole. It is the observation of Barentz, who, being at Nova Zembla, in the 76th degree of north latitude, perceived the sun above the horizon, fifteen days earlier than he expected. The altitude of the sun, in this case, was two degrees and a half greater than it ought to have been. Allowing one, or even one and a half, which is a very considerable concession, for the refraction of the atmosphere in winter, in the 76th degree of north latitude, still there would remain at least one degree for the extraordinary elevation of the observer above the horizon of Nova Zembla. On this occasion I have corrected an error of Bouguer, the academician, who fixes the greatest refraction of the sun, in every climate, at no more than 34 minutes. It is obvious that I do not avail myself of all the advantages given me by those whose opinions I am combating.

All these twelve proofs, deduced from the harmonies of Nature, mutually concur in demonstrating that the poles are elongated. They are supported by a multitude of facts, the number of which I might easily increase, whereas the academicians cannot apply their result of the flattening of the poles to any phenomenon of the earth, of the sea, or of the atmosphere, without immediately discovering it to be erroneous. Besides, geometry alone is sufficient to convince them of this.

They have, it is true, made the vibrations of the pendulum to tally with it; but this experiment is liable to a thousand errors. It is at least as much to be suspected as that of the burning glass, from which they concluded that the moon's beams had no heat, though the contrary has been proved, at Rome and at Paris, by professors of natural philosophy. The pendulum is lengthened by heat, and contracted by cold. It is extremely difficult to counterbalance its variations by a number of rods, of different metals. On the other hand, it is extremely easy for men, prepossessed from their childhood, in favor of the doctrine of attraction, to make a mistake of a few lines on its side. Besides, all these petty expedients of physics, liable to so many errors, cannot, by any means, contradict the elongation of the poles of the earth, of which nature exhibits the same results on the land, on the sea, in the air, and in the heavens.

The elongation of the poles being proved, the current of the sea and tides follows of course. Many persons observing a coincidence between our tides and the phases of the moon, in their increases and diminutions, are persuaded that this luminary is, from her attraction, the first principle of those phenomena; but this coincidence exists only in part of the Atlantic Ocean. They proceed not from the attraction of the moon acting upon the seas, but from her heat, reflected from the sun, on the polar ices, the effusions of which it augments, conformably to certain laws, peculiar to our continents. In every other part of the globe, the number, the variety, the duration, the regularity and irregularity of the tides, have no relation to the phases of the

moon, but, on the contrary, correspond with the influence of the sun on the polar ices, and the configuration of the poles of the earth. This we shall proceed to demonstrate, employing the same principle of comparison which enabled us to refute the error of the academicians, with respect to the flattening of the poles, and to demonstrate the truth of my theory of their elongation.

If the moon acted, by means of her attraction, on the tides of the ocean, her influence would likewise extend to mediterraneans and lakes. Now this is not the case, since mediterraneans and lakes have no tides, or at least no lunar tides; for we have observed, that the lakes situated at the foot of icy mountains, have, in summer, solar tides, or a flux, like the ocean. Such is the lake of Geneva, which has a regular flux in the afternoon. This coincidence alone, between the flux of lakes adjacent to icy mountains and the heat of the sun, gives a high degree of probability to my theory of the tides; and, on the contrary, the disagreement of these same fluxes with the phases of the moon, as well as the tranquillity of mediterraneans when that luminary passes over their meridian, makes the doctrine of her attraction more than conspicuous. But we shall presently see, that, in the vast ocean itself, most of the tides have no kind of relation, either to her attraction or to her course.

I have already quoted, in the first volume, Dampier, the navigator, who informs us, that the highest tide he observed on the coasts of New Holland, did not take place till three days after the full moon. He affirms, like all the navigators of the south, that the tides rise very little between the tropics, that they are at most from four to five feet high in the East Indies, and only one and a half on the coasts of the South Sea.

Let me now ask, Why these tides between the tropics are so feeble and so much retarded, under the direct influence of the moon? Why the moon by her attraction produces two times a day in our Atlantic Ocean, and only one in many parts of the South Sea, which is incomparably more extensive? Why there are, in this same South Sea, diurnal and semi-diurnal tides, that is, of twelve hours and of six

hours? Why most of the tides take place invariably at the same hours, and rise to a regular height almost all the year round, whatever may be the irregularities of the phases of the moon? Why there are some which increase in the first and last quarter, as well as at the full and new moon? Why they are always higher in proportion as you approach the poles, and frequently set towards the line, contrary to the pretended principles of their impulsion?

These problems, which it is impossible to resolve by the theory of the moon's attraction at the equator, are easy of solution by the alternate action of the sun's heat on the ices of the two poles.

I shall first prove this diversity of the tides by the testimony of Newton's countrymen, and zealous partisans of his system. My witnesses are not obscure men; they are men of science, naval officers of the king of England, selected successively by the voice of the nation and the appointment of their prince, to circumnavigate the globe, and to make such observations as were likely to enlarge the knowledge of Nature. These were the Captains Byron, Carteret, Cook, Clerke, and Mr. Wales, the astronomer. To their testimony I shall subjoin that of Newton himself. Let us first examine what they say relative to the tides of the southern part of the South Sea.

In the road of the island of Massafuero, in 33° 45′ south latitude, and 80° 22′ west longitude from London, "the sea," says Captain Byron, "runs twelve hours to the north, and then flows back twelve hours to the south."

As the island of Massafuero is situated in the southern part of the South Sea, its tides, which set in to the north in April, consequently run towards the line, contrary to the lunar system: besides, its tides are of twelve hours, which presents another difficulty.

At English Creek, on the coast of New Britain, in the 5th degree of south latitude, and 152 degrees east longitude, "the tide," we are told by Captain Cartaret, "has a flux and reflux once in twenty-four hours."

At the Bay of Islands, in New Zealand, in latitude 34° 59′ south, and longitude 185° 36′ west, from the observations which Captain Cook was able to make on the

coast, relative to the tides, in December, 1769, the flood-tides set in from the north.

Here again are tides in the open sea which run toward the line, contrary to the impulsion of the moon. They descended at that season to New Zealand from the south pole, the currents of which were then in a state of activity, for the month of December is the summer of that pole. Those of Massafuero, though observed in the month of April by Captain Byron, had the same origin, because the currents of the north pole, which never begin before the end of March, at our spring equinox, had not yet checked the influence of the south pole in the southern hemisphere

At the mouth of Endeavour River, in New Holland, in latitude 15° 26′ south, longitude 214° 42′ west, where Captain Cook refitted his vessel after having run aground, neither the flood-tide nor ebb was considerable, except once in twenty-four hours, as he had found while the ship was fast on the rock. (*Cook's First Voyage, June*, 1770.)

At the entrance of Christmas Harbour, in Kerguelen's Land, in latitude 48° 39′ south, longitude 68° 42′ east, Captain Cook observed, while he was at anchor, that the flood-tide came from the south east, running two knots at least in an hour. (*Third Voyage, December*, 1776.)

Here again is another tide which descended directly from the south pole. It appears that this tide was regular and diurnal, that is, of twelve hours; for Cook adds, a few pages afterwards: "It is high water here at the full and change days, about ten o'clock; and the tide runs and falls about four feet.

At the island of Otaheite, in latitude 17° 29′ south, and longitude 149° 35′ west, and at that of Ulietea, in latitude 16° 45′ south, "some observations were also made on the tide, with a view of ascertaining its greatest rise at the first place. When we were there in my second voyage, Mr. Wales thought he had discovered that it rose higher than I had observed it to do, when I first visited Otaheite in 1769. But the observations we now made, proved that it did not; that is, that it never rose higher than twelve or fourteen inches at most.. And it was observed to be high water

nearly at noon, as well at the quadratures as at the full and change of the moon." *Cook's Third Voyage, December,* 1777.)

In this part of his journal, Cook gives a table of the tides at these islands, from the 1st to the 26th of November, from which it appears, that there was only one tide a day, which, in the whole course of the month, was at its mean height between eleven and one o'clock. It is, therefore, evident, that tides so regular at such different epochs of the moon, could have no relation to the phases of that luminary.

Cook was at Otaheite in the month of July, 1776, that is, in the winter of the south pole. He revisted the island in December, 1777, that is, in its summer; it is, therefore, possible that the effusions of this pole, being then more abundant, and nearer to Otaheite than those of the north pole, the tides might be higher in December than in July, and that Mr. Wales, the astronomer, was in the right.

Let us now examine the effects of the tides in the north part of the South Sea.

At Nootka Sound, on the coast of America, in latitude 49° 36′ north, longitude 233° 17′ east, "it is high water on the days of the new and full moon, at twenty minutes past twelve. The perpendicular rise and fall is eight feet nine inches; which is to be understood of the day-tides, and those which happen two or three days after the full and new moon. The night-tides, at this time, rise near two feet higher. This was very conspicuous during the spring-tide of the full moon, which happened soon after our arrival; and it was obvious that it would be the same in those of the new moon, though we did not remain here long enough to see the whole of its effect." (*Cook's Third Voyage, April,* 1778).

Here then are two tides a day, or semi-diurnal, on the side opposite to our hemisphere as on our own, whereas it appears that there is only one in the southern hemisphere, that is, in the South Sea only. Farther, these semi-diurnal tides differ from ours in this, that they take place at the same hour, and exhibit no increase till two or three days after the full moon. We shall presently assign the reason of these phenomena, inexplicable by the lunar system.

In the two following observations we shall find these tides in the northern part of the South Sea, observed in April, becoming, in higher latitudes on the same coast, stronger in May, and still stronger in June, which cannot by any means be referred to the course of the moon, which then passes into the southern hemisphere, but to the course of the sun, which passes into the northern hemisphere, and gradually warms the ices of the north pole, the fusion of which increases in the same proportion as the heat of that luminary. Besides, the direction of these northern tides toward the line, and other circumstances, will fully demonstrate that they derive their origin from that pole.

At the entrance of Cook's river, on the coast of America, in latitude 57° 51′ north, "was a strong tide setting to the southward out of the inlet. It was the ebb, and ran between three and four knots in an hour; and it was low water at ten o'clock. A good deal of sea-weed, and some drift-wood, were carried out with the tide. The water too became thick, like that in rivers; but we were encouraged to proceed by finding it as salt at low water as the ocean. The strength of the flood-tide was three knots; and the stream ran up till three in the afternoon." (*Cook's Third Voyage, May*, 1778.)

On sailing up the same inlet, in a part where it was only four leagues broad, "through this channel ran a prodigious tide. It looked frightful to us, who could not tell whether the agitation of the water was occasioned by the stream, or by the breaking of the waves against rocks or sands.—Here we lay during the ebb, which ran near five knots in the hour. Until we got thus far, the water had retained the same degree of saltness at low as at high water; and at both periods was as salt as that in the ocean. But now the marks of a river displayed themselves. The water taken up this ebb, when at the lowest, was found to be very considerably fresher than any we had hitherto tasted; insomuch that I was convinced that we were in a large river, and not in a strait communicating with the Northern Seas." (*Cook's Third Voyage, May* 30th, 1778).

What Cook calls an inlet, to which was afterwards given the name of Cook's Great River, is from its course, and

its brackish waters, neither a strait, nor a river, but a real northern sluice, through which the effusions of the polar ices discharge themselves into the ocean. Similar ones are found at the bottom of Hudson's Bay. Ellis had been mistaken in these, which he supposed to be straits, forming a communication between the Northern Ocean and the South Sea. It was for the purpose of dispelling the doubts which had remained on this subject, that Captain Cook undertook the same kind of investigation to the northward of California.

"In prosecuting the examination of the interior of Cooke's Inlet, or Great River, after we had entered the bay, the flood set strong in the river Turnagain, and the ebb came out with still greater force; the water falling, while we lay at anchor, twenty feet upon a perpendicular. (*Cook's Third Voyage, June*, 1778).

What Cook calls the ebb, or reflux, appears to me to be the flood-tide, or flux itself, since it was more boisterous and more rapid than what he denominates the flood; for the reaction can never be more powerful than the action. The falling tide, even in our rivers, is never so strong as the rising tide. The latter usually produces a bar, which the other does not.

Cook, prepossessed with the prevailing opinion that the cause of the tides is between the tropics, could not summon the resolution to consider this flood, which came from the interior of the land, as a real tide. Nevertheless, in the opposite part of this same continent, I mean at the bottom of Hudson's Bay, the flood-tide comes from the west, that is, from the interior of the country.

In the introduction to Cook's Third Voyage, we find the following observations on this subject:—"Middleton, who commanded the expedition in 1741 and 1742, into Hudson's Bay, had proceeded farther north than any of his predecessors, in that navigation. He had, between the latitude of 65° and 66° found a very considerable inlet running westward, into which he entered with his ships; and after repeated trials of the tides, and endeavours to discover the nature and course of the opening, for three weeks successively, he found the flood constantly to come from the east

ward, and that it was a large river he had got into, to which he gave the name of Wager River.

"The accuracy, or rather the fidelity, of this report was doubted by Mr. Dobbs, who contended that this opening is a strait, and not a fresh water river, and that Middleton, if he had examined it properly, would have found a passage through it to the Western American Ocean. The failure of this passage, therefore, only served to furnish our zealous advocate for the discovery with new arguments for attempting it once more; and he had the good fortune, after getting the reward of twenty thousand pounds established by act of parliament, to prevail upon a society of gentlemen and merchants to fit out the Dobbs and California; which ships, it was hoped, would be able to find their way into the Pacific Ocean by the very opening which Middleton's voyage had pointed out, and which he was believed to have misrepresented.

"This renovation of hope only produced fresh disappointment. For it is well known, that the voyage of the Dodds and California, instead of confuting, strongly confirmed, all that Middleton had asserted. The supposed strait was found to be nothing more than a fresh-water river, and its utmost western navigable boundaries were now ascertained by accurate examination."

Thus Wager's River produces a real tide from the west, because it is one of the sluices opening from the north into the Atlantic Ocean. It is, therefore, evident that Cook's Great River produces, on its side, areal tide from the east, because it is likewise one of the sluices of the north into the South Sea.

Besides, the height and the turbulence of these tides, of Cook's Great River, similar to those of the bottom of Hudson's Bay, Waigats' Straits, &c. the diminution of their saltness, their general direction towards the line, prove that they are formed in summer in the northern portion of the South Sea, as well as in the north of the Atlantic Ocean, by the effusion of the ices of the north pole.

In the sequel of Cook's voyage, conducted by Captain Clerke, we find two other observations on the tides, for which the lunar system is equally incapable of accounting.

At the English observatory, in the bay of Karakakoo, in the Sandwich Islands, situated in latitude 19° 28′ north, and longitude 240° east, "the tides are very regular, flowing and ebbing six hours each. The flood comes from the eastward; and it is high water at the full and change of the moon forty-five minutes past three, apparent time." (*March* 1779).

At the town of St. Peter and St. Paul, in Kamtschatka, in latitude 53° 38′ north, longitude 158° 43′ east, "it was high water on the full and change of the moon, at thirty-six minutes past four, and the greatest rise was five feet eight inches. The tides were very regular every twelve hours." (*October* 1779).

Captain Clerke, wedded, like Cook, to the system of the moon's attraction in the torrid zone, attempts, to no purpose, to refer to the irregular phases of that luminary, the tides which take place at regular hours in the South Sea, as well as their other phenomena. Mr. Wales, the astronomer, who accompanied Cook in his second voyage, is obliged to acknowledge the defectiveness of Newton's theory on this subject. In an extract, inserted in the general Introduction to Cook's last voyage, he says:—"The number of places at which the rise and times of flowing of tides have been observed, in these voyages, is very great; and hence an important article of useful knowledge is afforded. In these observations, some very curious and even unexpected circumstances have offered themselves to our consideration. It will be sufficient to instance the exceedingly small height to which the tide rises in the middle of the great Pacific Ocean; where it falls short two-thirds at least of what might have been expected from theory and calculation."

The partizans of the Newtonian system would find themselves reduced to a still greater embarrassment, were they required to explain in a satisfactory manner, first, why there are daily two tides of six hours in the Atlantic Ocean; in the next place, why there is only one of the twelve hours in the southern part of the South Sea, as in the island of Otaheite, on the coast of New Holland, on that of New Britain, at the island of Massafuero, and in other places; why, on the other hand, in the northern part of this same

South Sea, two equal tides of six hours are again observable every day at the Sandwich Islands; why they are unequal on the coast of America, at Nootka Sound; and why they are reduced to a single tide of twelve hours in nearly the same latitude at Kamtschatka, on the coast of Asia.

I could adduce other circumstances still more extraordinary. By these strongly marked, and numerous dissonances between the course of the tides and that of the moon, with a very small number of which, however, Newton was acquainted, he was compelled to acknowledge, as I have elsewhere observed, that "there must be some other mixed cause for the periodical return of the tides, with which we are still unacquainted." *(Newton's Philosophy, chapter* 18.)

This other cause, with which we have hitherto been unacquainted, is the fusion of the polar ices, which are from five to six thousand leagues in circumference in their winter, and from two to three in their summer. These ices, discharging themselves alternately into the bosom of the seas, produce all their various phenomena. If, in our summer, there are daily two tides in the Atlantic Ocean, it is on account of the alternate deflection of the two continents, the old and the new, which approach toward the north, and of which one pours by day and the other by night, the waters of the ice, melted by the sun, on the eastern and western side of the pole, which he encircles every day with his fires, and thaws for six months together. If there is a retardation of twenty-two minutes from tide to tide, it is because the cupola of the polar ices, in fusion, is daily diminishing, and because these effluxes are retarded by the sinuosities of the channel of the Atlantic. If, in our winter, there are likewise two tides, undergoing daily retardations on our coasts, it is because the effusions of the south pole, on their entrance into the channel of the Atlantic meet with two deflections at its mouth, one in America, at Cape Horn; the other in Africa, at the Cape of Good Hope. 'Tis, in my opinion, these two alternate deflections of the current of the south pole, that render those two capes, which receive their first impulsion, so tempes-

mous, and so difficult to be doubled, even during the summer of that pole, by vessels coming from the Atlantic Ocean; for then they are met in the very teeth by the currents which descend from the south pole. On this account, it is extremely difficult for them to double the Cape of Good Hope in November, December, January, February, and March, in sailing to India; and that, on the contrary, they pass it with ease in our summer months, because they are then aided by the currents of the north pole, which at that season waft them out of the Atlantic. They experience the reverse of this on their return from India, during the months of our winter.

I am led, by these considerations, to believe that ships bound to the South Sea would meet with fewer obstacles in doubling Cape Horn in the winter season than in the summer of that climate; for they would not then be driven back by the currents of the south pole into the Atlantic, and they would, on the contrary, be assisted in leaving it by those of the north pole. I could support this conjecture by the experience of several ships. That of Commodore Anson may, perhaps, be objected; but he did not double this cape till the months of March and April, which are two of the most tempestuous months in the year, on account of the general revolution which takes place in the atmosphere and in the ocean at the equinox, when the sun passes from one hemisphere to the other.

Let us now explain, upon the same principles, why the tides of the South Sea do not resemble those of the Atlantic Ocean. The south pole has not, like the north pole, a double continent, separating into two portions the effluxes which the sun daily thaws from its ices; nor has it, indeed, any continent: consequently it has no channel by which its effusions might be retarded. These effusions, accordingly, proceed directly into the vast South Sea, forming over the half of that pole a succession of divergent streams, which make the circuit of it, like the rays of the sun, in twenty-four hours. When a branch of these effusions meets with an island, it produces a tide of twelve hours, that is, of the same duration as the time required by the sun to warm the half of the icy cupola, through which passes the meridian of

the island. Such are the tides of the islands of Otaheite and Massafuero, of New Holland, New Britain, &c. Each of these tides is of the same duration as the course of the sun over the horizon, and is regular like its course. Thus, while the sun heats the southern islands of the South Sea twelve hours successively with his vertical fires, he cools them by a tide of twelve hours, thawed from the ices of the south pole by his horizontal beams. Contrary effects frequently proceed from one and the same cause.

A different order of tides exists in the northern part of the South Sea. In this part opposite to our hemisphere, the two continents again approach each other toward the north. They, therefore, discharge alternately in summer into the channel which separates them, the two semi-diurnal effusions of their pole, and they alternately collect there in winter those of the south pole, which produce two tides a day, as in the Atlantic Ocean. But as the channel formed to the north of the South Sea by the two continents, is exceedingly wide below the 55th degree, or rather, as it ceases to exist, in consequence of the abrupt trending away of America and Asia, which diverge to the east and west, it thence happens, that only such places as are situated in the line of the effusions from the northern part of those two continents have two tides a day. Such are the Sandwich Islands, situated just at the confluence of those two currents, at a proportionate distance from America and from Asia, in the 21st degree of north latitude. When such a place is more exposed to the current of one continent than to that of another, its two semi-diurnal tides are unequal, as at Nootka Sound, on the coast of America; but when it is completely out of the influence of the one, and entirely under that of the other, it receives only one tide a day, as at Kamtschatka, on the coast of Asia; and this tide is then of twelve hours duration, like the action of the sun on the half of the pole, the effusions of which are then undivided.

Hence it is obvious, that two ports may be situated on the same sea, and under the same parallel, and yet the one shall have daily two tides, and the other only a single tide, and that the duration of these tides, whether double or

single, whether double and equal, or double and unequal, whether regular or irregular, is always twelve hours in the twenty-four, that is, precisely the time the sun takes to warm half of the polar cupola, from which they flow; which cannot possibly be referred to the unequal course of the sun between the tropics, and still less to that of the moon, which in those parts is often but a few hours above the horizon.

I have therefore demonstrated, by simple, plain, and numerous facts, the discordance of the tides in most of the seas with the pretended attraction of the moon at the equator, and, on the contrary, their concordance with the action of the sun on the ices of the poles.

I beg the reader's pardon, but the importance of these truths induces me to recapitulate them.

1. The attraction of the moon on the waters of the ocean is contradicted by the inaction of the waters of mediterraneans and lakes, which never manifest any motion when that luminary passes their meridian, or even their zenith. On the contrary, the action of the sun's heat, which produces the currents and the tides of the ocean from the polar ices, is verified by its influence on the icy mountains, whence issue, in summer, currents and fluxes, that produce real tides, as may be observed in the lake of Geneva, situated at the foot of the Rhetian Alps. The seas are the lakes of the globe and the poles are its alps.

2. The pretended attraction of the moon on the ocean can neither be applied to the two tides of six hours, or semi-diurnal, of the Atlantic Ocean, because that luminary passes every day only at its zenith; nor to the tide of twelve hours, or diurnal, of the southern part of the South Sea, because it passes daily at the zenith and the nadir of that vast ocean; nor to the tides, whether semi-diurnal or diurnal, of the northern part of the same sea; nor to the variety of these tides, which rise here at the full* and new moon, and

* I admit, with Pliny, that the moon melts ice and snow by her heat. Accordingly, when she is full, she must increase the fusion of the polar ice, or tides. But, if these likewise rise on our coasts at the new moon, in my opinion, these superabundant effusions are

there several days afterwards,—which here increase in the quadratures, and there decrease; nor to their constant equality in other places; nor to the direction of those that set toward the line; nor to their elevation, which augments toward the poles and diminishes in the very zone of the lunar attraction, that is, under the equator. On the contrary, the action of the sun's heat on the poles of the earth, perfectly accounts for the height of the tides near the poles, and their weakness near the equator; their divergence from the pole whence they flow, and their exact concordance with the continents from which they descend, being double in twenty-four hours, when the hemisphere which discharges or receives them is divided into two continents; double and unequal when the deflection of the two continents is unequal; and single when they are discharged by only one continent, or when there is none at all.

3. The attraction of the moon, which always moves from east to west, cannot possibly be applied to the course of the Indian Sea, which flows six months towards the east, and six months towards the west; nor to the course of the Atlantic Ocean, which runs six months to the north and six months to the south. On the contrary, the action of the half-yearly and alternate heat of the sun around each pole, covered with an ocean of ice five or six thousand leagues in circumference in winter, and two or three thousand in summer, perfectly corresponds with the half-yearly and alternate current descending from that pole, and flowing towards the opposite pole, according to the direction of the continents and archipelagoes, which serve it for shores.

On this subject I shall observe, that though the South Sea apparently presents no channel to the course of the polar effusions, in consequence of the great divergence of America and Asia, we may, however discover one percep-

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occasioned by the full-moon, and are retarded in their course by some particular configuration of one of the two continents. For the rest, this point is not more difficult to be resolved by my theory, than by that of attraction, which is, besides, incapable of explaining most of the nautical phenomena of which I have been treating.

tibly formed by the projection of its archipelagoes, which correspond with its two continents. It is by means of this channel that the Sandwich Islands, situated in the northern part of the South Sea, in the latitude of 21°, have daily two tides, from the effusions of America and Asia, though the strait which separates those two continents is in the latitude of 60° north. Not that these islands are exactly under the same meridian; but the Sandwich Islands are situated in a curve corresponding with the sinuous curve of America, and which commences at the northern strait. This curve might be prolonged to archipelagoes at a greater distance from the South Sea, which have two tides a day; and it would there express the current formed by the effusions of America and Asia, as we have elsewhere observed. All the islands are in the midst of currents. Taking, therefore, a bird's eye view of the south pole on a globe, you perceive a succession of archipelagoes scattered in a spiral line quite into the northern hemisphere, and indicating the current of the South Sea, as the projection of the two continents toward the north pole indicates the current of the Atlantic.

Thus, the course of the seas from one pole to another is in a spiral direction round the globe, like the course of the sun from one tropic to the other.

This observation adds a new degree of probability to the correspondence of the motion of the sea with that of the sun. Not but that the chain of archipelagoes, extending in a spiral form across the South Sea, is interrupted in several places; but these interruptions proceed, in my opinion, only from the imperfection of our discoveries. We might, I conceive, extend them much farther, if we were to guide our search of the unknown islands of that sea by the projection of the islands with which we are already acquainted. Those who might undertake these voyages should not go directly from the Line to the South Pole, or describe the same parallel all round the globe, as is usually done, but should follow the above-mentioned spiral line, which is sufficiently marked by the general current of the ocean itself. They should not fail to observe the nautical fruits which the alternate current of the seas is continually waft-

ing from one island to another, frequently at prodigious distances. By these simple and natural means, the ancient inhabitants of the south of Asia discovered so many islands of the South Sea, where traces of their manners and their language are still discovered. Thus, by abandoning themselves to Nature, who is frequently more serviceable to us than our knowledge, they landed without quadrant and without chart, on a multitude of islands of which they had never heard.

In the first volume I have indicated those easy means of discovery and of communication between maritime nations. I allude to the explanation of the plate of the Atlantic Hemisphere, where I mention Christopher Columbus, who, being on the point of perishing in the open sea, on his first return from America, enclosed the narrative of his discovery in a cask, which he threw into the sea, in the hope that it would be wafted to some shore or other. On this occasion I have observed, that, "a common glass bottle might preserve such a deposit for ages, and convey it more than once from one pole to the other." This experiment has been realized in part on the coasts of Europe.* An account of it

* I invite mariners who are interested in the progress of the natural sciences to repeat this experiment, which is so easy, and attended with so little expence. There is no place where empty bottles are more common, and of less use, than on board-ship. When a vessel sails from port, she carries out a great quantity of bottles filled with wine, beer, cider, and spirits, most of which are empty in the course of a few weeks; while those to whom they belong have nothing wherewith to replenish them during the whole voyage. Before they are thrown into the sea, a little stick, with a small piece of cloth or white feathers, at the top, might be fastened to it perpendicularly. This mark would render it conspicuous at a distance on the azure bosom of the deep. It would be advisable to tie cords round it, to prevent its being broken on reaching the shore, whither it would sooner or later be wafted by the currents and the tides. These experiments will have the appearance of children's play in the eyes of our men of science; but to the mariner they might prove of the utmost importance. They might serve to make him acquainted with the direction and the velocity of the currents, in a much more certain and comprehensive manner than the log which is thrown overboard, or than the boats which are lowered into the sea. This last method, though frequently employed by the celebrated Cook, can only give the relative velocity of the boat and the ship, and not the intrinsic velocity of the current. Finally, these essays

was given in the *Mercure de France* of Saturday, January 12th, 1788, in the following terms:

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hazardous as they are, may afford navigators an opportunity of transmitting intelligence to their friends in distant parts of the world as appears from the experiment made in the Bay of Biscay; and of obtaining relief from them in case they should be shipwrecked on some desert island.

We do not place sufficient confidence in Nature. In preference to bottles we might make use of some of the trajectiles which she employs in different climates, to preserve the chain of her correspondence over the whole face of the globe. The cocoa is one of those that are most widely diffused through the tropical seas. This fruit is frequently wafted to the distance of five or six hundred leagues from the shore where it grew. Nature formed it for traversing the ocean. It is of an oblong form, and triangular, so that it floats on one of its angles as upon a keel, and passing through rocky straits, it is cast upon the shores, where it soon begins to sprut. It is preserved from injury when it lands, by a thick covering or husk, which is one or two inches thick in the circumference of the fruit, and three or four at the pointed part, which may be considered as prow, with so much the more justice as the other end is flat, like the poop of a ship. This husk is covered, externally, with a smooth, coriaceous membrane, on which letters might be traced; and it is composed internally of filaments interwoven and mixed with a substance resembling saw-dust. By means of this elastic covering, the cocoa may be dashed by the waves against rocks, without breaking Besides, its internal shell is of a matter more flexible than stone, and harder than wood; impervious to water, in which it may continue a long time without becoming putrid; as well as the husk, of which the Indians make excellent cables for their vessels. The shell of the cocoa is so hard, that its shoot could never force its way through it, had not Nature contrived at its pointed part, where the husk is the thickest, three small holes, covered with a mere pellicle.

There are many other bulky vegetables which are carried by the currents of the sea to prodigious distances, such as the firs and the birches of the north, the double cocoa-nuts of the Sechelles islands, the bamboos of the Ganges, the large rushes of the Cape of Good Hope, &c. Their stems may easily be written upon with the point of a shell, and they may be rendered perceptible at sea by some conspicuous mark.

Similar resources may be found among amphibious animals, such as tortoises, which travel great distances by means of the currents. I have somewhere read, in the History of China, that one of its ancient kings, accompanied by a multitude of people, one day saw a tortoise coming out of the sea, with the laws which at this day form the basis of the Chinese government, inscribed on its back. This legislator had probably taken advantage of the moment when the tortoise went on shore, according to custom, to fix upon a place for laying her eggs, to write on her back the laws he was desirous of establishing; and in like manner availed himself of the day after her visit, when that animal invariably returns to the same spot to lay, in order to impress a simple people with respect for laws that pro

"In the month of May last, some fishermen of Arromanches, near Bayeux, found in the open sea a small bottle well corked. Impatient to discover what it contained, they broke it, and found a letter, the direction of which they were unable to read, as it was in English. They carried it to the judge of the Admiralty, by whom it was deposited in the Registry. The superscription announcing that it was intended for an English lady, he took such measures as prudence dictated to ascertain that such a person was in existence, and to transmit the letter in safety. The husband of this lady, a man of letters, well known in his native country for several justly-esteemed works, has returned an answer; and, assuring the judge of his gratitude with the strongest expressions, he informs him that the letter in question was written by his wife's brother, on his way to the East Indies. He was desirous of writing to his sister, an idea which he conceived from seeing a ship in the Bay of Biscay apparently bound for England. He hoped to pass sufficiently near to her, but the vessel standing off, he resolved to put the letter into a bottle, and to throw it overboard.

Desirous of giving to such an important fact all the authenticity of which it is susceptible, I wrote to a friend of mine, a lady in Normandy, who cultivates with great taste the study of nature in the bosom of her family, requesting her to apply to the Judge of the Admiralty at Arromanches, for some particulars that I wished to obtain from England. His answer, as transmitted to me on the 24th February, 1788, was as follows:

"The bottle was found two leagues out at sea to the

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ceeded from the bosom of the deep, at the sight of the wonderful tablets on which they were inscribed.

Sea-fowl might furnish other and more speedy means of communication, as their flight is extremely rapid; and they are so familiar on desert shores, that you may catch them by the hand, as I know from my own experience at the island of Ascension. Some conspicuous mark might be fastened to them, together with a billet; and such might be chosen in preference as arrive at different seasons and visit different shores and even land birds of passage, such as the ring-dove.

right of the parish of Arromanches, which lies two leagues to the north east of the town of Bayeux, on the 9th of May, 1787, and was deposited on the 10th in the registry of the Admiralty.

"Mr. Elphinstone, the husband of the lady to whom the letter was addressed, observes, that it is not absolutely certain whether the writer of the letter put it into the bottle in the Bay of Biscay, on the 17th of August, 1786, in latitude 45° 10′ north, longitude 10° 56′ west, as it is dated; or whether it was committed to the waves by some person on board the passing ship. The latter was called the Naquet; the name of that bound to Bengal was the Intelligence, commanded by Captain Linston.

"The names of the fishermen are; Charles le Romain, master of the vessel; Nicolas Fresnel, Jean Baptiste le Bas, and Charles l'Ami, seamen, all of the parish of Arromanches.

(Signed) "PHILIPPE DE DELVILLE."

The parish of Arromanches, is in the longitude of about one degree west of the meridian of Greenwich, and in the latitude of 49° 5′ north. Thus the bottle, thrown into the sea in the longitude of 10° 56′ west, and the latitude of 45° 10′ north, traversed nearly 10 degrees of longitude, which in that parallel, at 17 leagues to a degree, makes 170 leagues towards the east. Farther, it proceeded northward four degrees, as it was picked up two leagues to the north of Arromanches, that is in latitude 49° 10′, which makes 100 leagues toward the north, and for its whole course 270 leagues. In accomplishing this passage it took 266 days, from the 17th of August, 1786, to the 9th of May, 1787, which is at the rate of about a league a day. Its progress cannot by any means be compared for velocity to that of the wrecks of the engagement off Ostend, which travelled to the Azores, at the rate of more than 35 leagues a day, as I have stated in my first volume. The reader might be inclined to doubt this observation of Rennefort, and likewise the inference I have deduced from it, in confirmation of the velocity of the general current of the ocean, had I not proved it elsewhere by several other nautical

facts, and had not the journal of navigators been full of similar remarks, which attest that the currents and tides frequently waft ships three or four miles an hour, and even rush with the rapidity of sluices, proceeding at the rate of eight or ten knots an hour, in the straits adjacent to the polar ices in fusion, according to the testimonies of Ellis, of Linschoten, and of Barentz. But I am enabled to assert, that the slow progress of the letter, thrown overboard in the entrance of the Bay of Biscay, to the coasts of Normandy, is a new proof of the existence and of the velocity of the alternate and half-yearly current of the Atlantic Ocean, which was before unknown, which I have assimilated to that of the Indian Ocean, and explained by the same cause.

The reader may convince himself by pricking the chart, that the spot where the English bottle was thrown into the sea, is more than 80 leagues from the continent, and precisely in the middle of the mouth of the Channel, through which passes a branch of the general current of the Atlantic, that, in summer, wafted the wrecks of the engagement off Ostend to the Azores. Now, this current likewise set to the south when the English voyager committed to it a letter for his friends in the north, since it was the 17th of August, that is, during the summer of our pole, when the effusions of its ices flow toward the south. The bottle therefore floated towards the Azores, and undoubtedly to a great distance beyond those islands, during the remainder of the month of August and the whole of September, till the revolution of the equinox, when the effusions of the south pole check the current of the Atlantic, carried it back toward the north.

We cannot then calculate that it turned back before the month of October, when I suppose it to be in the vicinity of the line, the calms of which might possibly have arrested its progress, till it experienced the influence of the south pole, which does not acquire activity in our hemisphere till about the month of December. At that season, the current of the Atlantic which flows northward, being the same as that of our tides, it might have approached our shores, and there have been exposed to many retardations, from the

disgorging of the rivers which discharge themselves into the sea across its course, but above all by the re-action of the tides; for if their flux sets to the north, their reflux must consequently recede toward the north.

It is, therefore, essential to make these experiments in the open sea, and especially to pay attention to the direction of the current of the ocean, lest letters intended for the north should be sent to the south. In the season when this current is unfavorable, we might avail ourselves of the tides which frequently set in a contrary direction; but as I have just observed, this is attended with one great inconvenience, namely, that if their flux advances to the north, their reflux must recede toward the south.

The tides have, in their very flux and reflux, a perfect consonance with the general currents of the sea and the course of the sun. They flow twelve hours a day, either if they are divided into two tides of six hours by the deflection of two continents, as in the northern hemisphere, or if they run for twelve successive hours, as in the southern hemisphere: in like manner, the general current of a pole flows six months in the space of a year. Thus the tides which are of twelve hours, in every case, are of a duration precisely equal to that which the sun takes to thaw half of the polar hemisphere from which they flow, that is, half a day; as the general current which issues from this pole, flows precisely during the same time as the sun heats the whole of that hemisphere, that is, for half a year. But as the tides, which are only polar effusions of half a day, have refluxes equal to their fluxes, that is of twelve hours, so the general currents, which are half-yearly effusions of an entire pole, have refluxes eqnal to their fluxes, that is of six months, when the sun sets those of the opposite pole in activity.

If time and place permitted, I would demonstrate how these same general currents which are the secondary causes of tides, sometimes carry them backward or forward out of their reckoning, according to the season of each pole. Of this I could find a multitude of proofs in voyages round the world, and among others, in Captain Cook's second and third voyage. These currents frequently render it exceed-

ingly difficult for ships to make the land. For example, when Cook set sail from Otaheite in December 1777, to prosecute his discoveries in the north, he came to the Sandwich Islands, which he made without difficulty, because he was favored by the current of the south pole; but when he returned from the north to procure refreshments at these same islands, this southern current was so contrary during the same season, that though he came in sight of them on the 26th of November, 1778, he was obliged to stand off and on above six weeks, nor was he able to come to an anchor till the 17th of January, 1779. Accordingly, the proper season for visiting islands situated in a higher latitude than that from which we take our departure, is the winter of their hemisphere; for we are then favored by the currents of the opposite hemisphere, as is proved by Cook's first voyage to the Sandwich Islands. But the contrary takes place when we are desirous of making an island in a less elevated latitude, in the winter of its hemisphere, as is obvious from the example of his return to the same islands. I could adduce a multitude of facts in favor of a theory so important to navigation, but it would be abusing the attention of the reader. I therefore flatter myself, that I have placed in the clearest light the concordance of the movements of the seas with those of the sun, and their discordance with the phases of the moon.

I could adduce more than one objection against the very system of attraction by which Newton accounts for the motion of the planets in the heavens. Not that I deny in general the law of attraction, whose effects we observe upon the earth in the gravity of bodies and in magnetism; but, in my opinion, the application which Newton and his partisans have made of it to the course of the planets, is not just. According to Newton, the sun and the planets reciprocally attract each otner with powers in a direct ratio to their masses, and in an inverse ratio to the square of their distance. A second power is combined with attraction, to keep the planets in their orbits. From these two powers results an ellipsis for the curve described by each planet: this ellipsis is continually altered by the action exercised the planets upon each other. By means of this theory,

the course of the stars is traced in the heavens with the utmost precision, according to the Newtonians. The course of the moon alone seemed to disagree with this system; but, to adopt the words of an Introduction to the Study of Astronomy, an extract from which appeared in the *Mercure* of the 1st of December, 1787, "This satellite, called by the celebrated Halley a rebellious star, *cidus pertinax*, on account of the great difficulty of calculating the irregularities of her course, has been at length subdued by the learned methods of Messrs. Clairault, Euler, d'Alembert, La Grange, and Laplace."

Thus, then, the most rebellious stars are subjected to the laws of attraction. I have but one small objection to make against this empire, and the learned methods which have subdued the course of the moon. How is it possible that the reciprocal attractions of the planets could have been calculated with such precision by our astronomers, and that their masses could have been weighed with such accuracy, since the planet discovered some years since by Herschel, has not yet been placed in their scales? Has this planet no attraction, or, is it not itself attracted?

God forbid that I should have any intention of destroying the reputation of Newton, and the men of science who have adopted his system. If, on the one hand, they have involved us in some errors, they have contributed, on the other to increase the knowledge of the human mind. Had Newton made no other discovery than his telescope, posterity had been deeply indebted to him. He enlarged for man the sphere of the universe, and the sentiment of the infinity of God. Others have diffused a partiality for the study of nature through all ranks of society, by the magnificent pictures of her works with which they have presented us. In pointing out their errors, I have respected their virtues, their talents, their discoveries, and their painful exertions. Men equally celebrated, such as Plato, Aristotle, Pliny, and Descartes, had, like them, obtained credit for great errors. The philosophy of Aristotle alone had been, for a series of ages, the greatest obstacle to the research of truth. Let it never be forgotten, that the republic of letters ought to be a real republic, recognizing

no other authority than that of reason. Besides, nature has placed each of us in the world, in order to correspond directly with her. Her intelligence illumines every mind, as the sun dispenses light to every eye. To study her works in systems only, is to observe them with the eyes of another.

I have not, then, been solicitous to raise myself upon the ruins of any one. I seek no pedestal: a sod is sufficient for him who courts nothing but repose. If I myself durst write the history of the weakness of my own understanding, I should excite the compassion of those whose envy I have perhaps irritated. Of how many errors have I not been the sport since the period of infancy! These prejudices I adopted, not on the faith of others, but on my own. It is not admirers, but indulgent friends that I am solicitous to obtain. I feel much greater obligations to one who excuses my failings, than to him who exaggerates my feeble virtues. The one assists me in my weakness, the other supports me in my strength; the one loves me in my indigence, and the other in my supposed wealth. I formerly sought friends among the great, but I found among them scarcely any but men who want only complaisant clients, patrons who prop themselves upon you instead of supporting you, and crush you whenever you attempt to recover your liberty. I now wish for no other friends than souls that are simple, sincere, mild, innocent, and tender. They are more interesting to me, ignorant than learned, in adversity than in prosperity, in the cottage than in the palace. For them I composed my work, and to them it owes its success. They have done me more good than I ever wished them, for their own repose. I have given them some consolations, and in return they have conferred glory. I have presented to them nothing but hopes, and they have been eager to render me a thousand good offices. I had paid attention only to their pains, and they have been anxious to promote my happiness. To acquit myself of the debt I owed them, I have written this fourth volume.* May it

* This Supplement, as the translator entitled it, is prefixed, in the original, to the fourth volume.

anew procure me their approbation, so free, so pure, so affecting! This is the sole object of my desire. Ambition disdains it, because it is not invested with power; but time will one day pay it due respect, for such approbation intrigue can neither give nor destroy.

Some persons to whom I have read the book entitled *The Gauls*, expressed a wish that I would not publish it till the completion of the work of which it composes a part; but I know not whether I shall ever find leisure to finish it, and whether this kind of antique composition will be relished by the present age. 'Tis, in truth, only a fragment; but, such as it is, it forms a complete work, since it presents an entire picture of the manners of our ancestors at the time of the Druids. Besides, the most finished performances of men are nothing but fragments. The history of a king is but a fragment of that of his dynasty; the history of his dynasty of that of his kingdom; the history of his kingdom of that of mankind, which is itself but a fragment of that of the creatures which inhabit the globe, whose universal history would form, after all, but a very small chapter in the history of the numberless stars which rod above our heads, at distances which it is impossible to calculate.

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